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ENGLISH BOTANY;

OR,

COLOURED FIGURES

OF

BRITISH PLANTS,

WITH THEIR

ESSENTIAL CHARACTERS, SYNONYMS, AND PLACES OF GROWTH.

BY

SIR JAMES EDWARD SMITH, M.D. F.R.S.

PRESIDENT OF THE LINNÆAN SOCIETY, ETC. ETC.

THE FIGURES BY

JAMES SOWERBY, F.L.S. G.S. &c.

> "...... quos ipsa volentia rura
> Sponte tulere sua ...." VIRGIL.

THE SECOND EDITION,

ARRANGED ACCORDING TO THE LINNÆAN METHOD;

WITH THE DESCRIPTIONS SHORTENED, AND OCCASIONAL REMARKS.

BY CHARLES JOHNSON,

LECTURER ON BOTANY, GUY'S HOSPITAL.

VOL. XII.

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ENGLISH BOTANY.

CLASS XXIV. CRYPTOGAMIA.

ORDER IX. ALGÆ. FLAGS.

THE Algæ apparently present a far greater range in structure than the Lichens; and, like the latter, their diversified forms are rather associated by resemblance in habit than by any positive or definite characters. They are peculiarly the "vegetation of the waters;" and in this aspect opposed to every other order of the vegetable kingdom, the species of which, even those the most essentially aquatic, require more or less, constantly or periodically, the direct influence of the atmosphere for the performance of their vital functions: the Algæ, on the contrary, grow for the most part submersed, a few only of the simpler kinds vegetating on damp ground, walls and stones, and always in situations where water is present, either accumulated or transfusing; it is the element of their existence.

In their simplest observable forms the Algæ appear as single globular vesicles of exceeding minuteness, consisting of a delicate transparent membrane, filled with a fluid or mucous matter, and innumerable coloured granules, collectively styled the *endochrome*[*]; the granules enlarge gradually, and eventually burst the including membrane, being the sporules or germs of the succeeding generation: such are the species belonging to the genera *Palmella* and *Protococcus*. The little globular vesicles, here regarded as distinct vegetable beings, are often found scattered promiscuously upon a thin film of slimy or gelatinous substance.

Another series, higher on the structural scale, is seen in the Confervoid or Articulated Algæ, to which belong most of those finely pencilled or filamentous plants that constitute

[*] *From ἔνδον, inner, and χρῶμα, colour.*

so large a proportion of the more brilliant and beautiful examples of marine vegetation. In many of these, which are composed of vesicles placed end to end in indefinite series, the microscope discovers each filament to be invested by a transparent film, so that the condition of such a plant might be represented, not unaptly, by suspending a necklace of hollow beads in a glass tube: this tube in the living plant is glutinous, and occasions most of the more delicate sea-weeds to adhere firmly to paper in drying. A similar coating is found upon the larger and more complicated species, in which it may be considered to prefigure the cuticle or outer skin that invests the surface in the higher orders of plants. This transparent tube, which gives a continuous or even surface to the otherwise jointed, hair-like stems or branches of a *Conferva*, accords so nearly in appearance with the expanded film upon which the vesicles of *Protococcus* and its allies are found lying, that there is reason for believing them of the same nature, and that they only differ in consequence of the different degrees of vital energy regulating the growth of their respective vesicles, which, where separate, are too feeble to overcome the inertia of the film on which they are generated; but where combined, convert it, by their greater assimilative power, into a protecting cover.

A third great natural division of these plants is presented by the Fucoid, or as they are more generally styled, Inarticulated Algæ; through the several grades of which the cellular structure of the order is traceable to its most elaborate or complicated form. In these the vesicles are aggregated in breadth as well as in length, forming leaf-like expansions or cylindrical stems and branches.

The modes of reproduction in the higher Algæ are various. In the simplest of the Confervoid division the species seem to be propagated by the diffusion of the endochrome, in a similar manner to that already mentioned as occurring in the single-celled genera, the vesicles being ruptured indiscriminately by the enlargement of its granules. In others, of more advanced structure, the terminal vesicle only dilates and assumes the appearance and office of a theca or sporule-case, or similar vesicles are developed in the axils of the branches for the fulfilment of this function: in all however of this division the sporules appear to be the separate granules of the endochrome. On the contrary, the reproductive germs of the Fucoid section seem to consist individually of the consolidated endochrome of an entire vesicle, the dark-coloured sporule being evidently in many species invested with a transparent and almost membranous coat. They are variously disposed, sometimes scattered, sometimes aggregated in masses or clusters; and occupy either peculiar processes called *receptacles*, or lie imbedded in the substance of the plant, from which they burst irregularly, or are discharged through a pore at the apex of their containing tubercle. In many species of this division two or more forms of fructification are observable, but rarely more than one on the same individual, analogous to what has been previously remarked on as occurring in the Mosses and Lichens.

Some of the Algæ float loosely in the water, but by far the greater number grow attached to rocks, stones, and other substances, being fixed by the extension of their base into a plane or more or less concave surface called a *scutum*; or otherwise the same part throws out many fibres, simple or branched, by means of which it grapples so firmly to the stone as to be often almost inseparable without laceration of its substance: in either case these processes, however, are rather to be regarded as prefigurations of the root, developed only to secure the plant a fixed habitat, than as fulfilling the more active functions belonging to that important organ in the higher orders of vegetation; the nutrition of the Algæ being apparently derived by absorption from the surrounding medium over their whole surface.

The uses to which the Algæ have been adapted by man are comparatively few, and will be chiefly noticed in the descriptions of the genera and species. Consisting mostly of mucilage and albumen they are highly nutritious, and several species are employed as food: not any of them indeed are deleterious, a circumstance that, as remarked by the late Professor Burnett, seems due to the simplicity of their structure, which renders them incapable of elaborating those powerful proximate principles that give character to the more complex plants as useful medicines or virulent poisons. An exception to this seems certainly to exist in the presence of iodine in the different species of sea-weed; but as that is a principle found in most marine productions, and, above all, in the water of the sea itself, there seems no reason for considering it to be the result of any vegetative process, although certain species of *Fucus* and *Laminaria* are at present the chief sources whence that valuable medicinal agent is obtained. The mucilage of many plants of the order affords an excellent substitute for isinglass and other animal jelly, whether employed as a nutritious medium or for any other economical purpose. In the manufacture of kelp the marine Algæ are important in a commercial point of view, and to their utility in the mass, as a cheap and profitable manure, the farmers upon our coasts can testify.

In the economy of Nature the Algæ are a more important group. Their numbers and universal distribution are in evidence of this; the ocean in every part from the Polar seas to the Equator swarms with them; they dwell in every river and lake, stagnant ditch and pool; even the ice and snow of Greenland and Nova Zembla have their species, so have the boiling fountains of the Geysers. Of their ministry we know not the extent. We know that water, exposed to the light of the sun for a day or two, deposits a green crust upon the vessel which contains it, and that if from any cause this deposit does not take place the water soon becomes putrid: we see in every little pool left by the rain a similar green matter formed, and, if it remain a short time longer, light green fibres crossing each other in all directions through the fluid, and under these conditions it retains its freshness and limpidity. The simple plants to whose presence this green appearance is due, are performing here, on a small scale, the same functions that are incessantly operating on a larger in the ditches, stagnant ponds, lakes, and rivers; they assimilate to their own support and growth those putrescent particles of animal and vegetable matter that, accumulating from time to time, produce those fatal exhalations so long observed and dreaded under the names of miasma and malaria. They may not in all situations be proportioned to the quantity of these, but must always act as a powerful check to the increase of the evil; and the more so by the abundance of oxygen which many of them evolve under exposure to the sun.

The minuteness of the germs of these plants renders them invisible to us except by the assistance of the microscope, hence they have been supposed by some to grow spontaneously, an opinion favoured by their production in isolated vessels and pools of rain-water on the ground; a phenomenon only to be accounted for by admitting their capability of retaining life and the vegetative faculty for indefinite periods.

The influence of the Sea-weeds upon their natural element is probably similar to that observed of the freshwater species. This vast body of water, abounding in animal life, would, by the natural exuviæ of its own inhabitants, soon become incapable of supporting their existence; but, independent of this, it is the grand cesspool of the earth, receiving on every side into its mighty basin all that is most noxious to the dwellers of the land; every tide sweeps nuisance from its shores, every river bears with ceaseless current its tribute of offal to the general reservoir, the scavenger as well as the fertilizer of the country which it traverses. How admirably are the abundance, the rapidity of growth, and universal distribution of the various species of marine vegetation disposed to rectify this, to purify the wide expanse of waters, which must otherwise quickly spread the seeds of death to every living thing upon the earth by its putrefactive poison! The Algæ of fresh waters are of thin slight texture, and contain but a small proportion of solid matter compared with their bulk; those of the ocean, on the contrary, growing with equal rapidity, are for the most part of hard, tough, frequently almost woody substance, and consequently require for their support a larger quantity of the assimilative matter, which they seem destined to convert from poison into wholesome food. It is by such faint shadowings of design, which observation tends to elicit from productions apparently useless in the eye of the superficial, that the philosophic mind acquires an insight into the plans of Almighty Wisdom, and a purer feeling of gratitude for its manifold blessings, than the mere enjoyment of every-day benefits, however well appreciated, could ever inculcate or arouse.

The distribution of the Algæ, like that of aërial plants, and as well in regard to their great divisions as to their tribes, genera, and species, seems to be much affected by climate and other local circumstances. Thus the simpler and articulated kinds are chiefly confined to the temperate and colder parts of the earth; while the range of the inarticulated, although universal as regards the mass, is greatly diversified as to the disposition of families and individuals, almost every sea and gulf, and every geographical department of the main ocean possessing its characteristic vegetation. Like the plants of the land too, they seem to be affected by soil, or the nature of the rock to which they adhere, certain species being never met with but on media of peculiar composition: thus, limestone, basalt, chalk, and sandstone, favour each the production of some kinds in preference to that of others. Some species grow scattered; others vegetate in masses, some of the smaller species covering large extents of surface to the almost total exclusion of others, as the grasses do on our meadows and pastures; while many of the larger are aggregated in mimic woods and forests, each as striking in its characters and as diversified in appearance as those of the earth: and although, when exposed to view on rocks left bare by the tide, they lie prostrate, a circumstance that has obtained for them the popular name of Flags, they have generally an erect position under water, and many of them attain a size and height that, to one who had only noticed them growing near the shore, would seem almost incredible.

The old Linnæan genera, *Fucus*, *Ulva*, and *Conferva*, under which most of the plants of this extensive order appeared in the first edition, have been divided by later naturalists, and the study of one of the most beautiful and interesting departments of Botany much enhanced by their successive labours. In the arrangement of these modern genera, as in that of the Lichens of our last volume, the Cryptogamia of Sir W. J. Hooker, forming the 2nd volume of his 'British Flora,' will be almost implicitly followed, a classification as nearly structural as the present state of our knowledge of these obscure plants will allow. Of the four great groups or divisions of the order here admitted, the first,

INARTICULATÆ,

comprises the whole of the old *Fuci* and *Ulvæ*, and the generic characters are adopted from Dr. Greville's beautiful illustrative work, 'Algæ Britannicæ': the second,

CONFERVOIDEÆ,

contains nearly all of the original *Confervæ*, or Articulated Algæ, together with certain filamentous genera bordering upon the Fungi, and others, as *Oscillatoria*, that may hereafter be found referable to the animal kingdom; the two latter being only placed provisionally in this group, on account of their real, or more or less apparently articulated structure: the third, entitled

GLOIOCLADEÆ,

includes the lowest forms of the order, the plants consisting for the most part of globules or vesicles connected in moniliform series, or separate, or aggregated in amorphous gelatinous masses: the fourth,

DIATOMACEÆ,

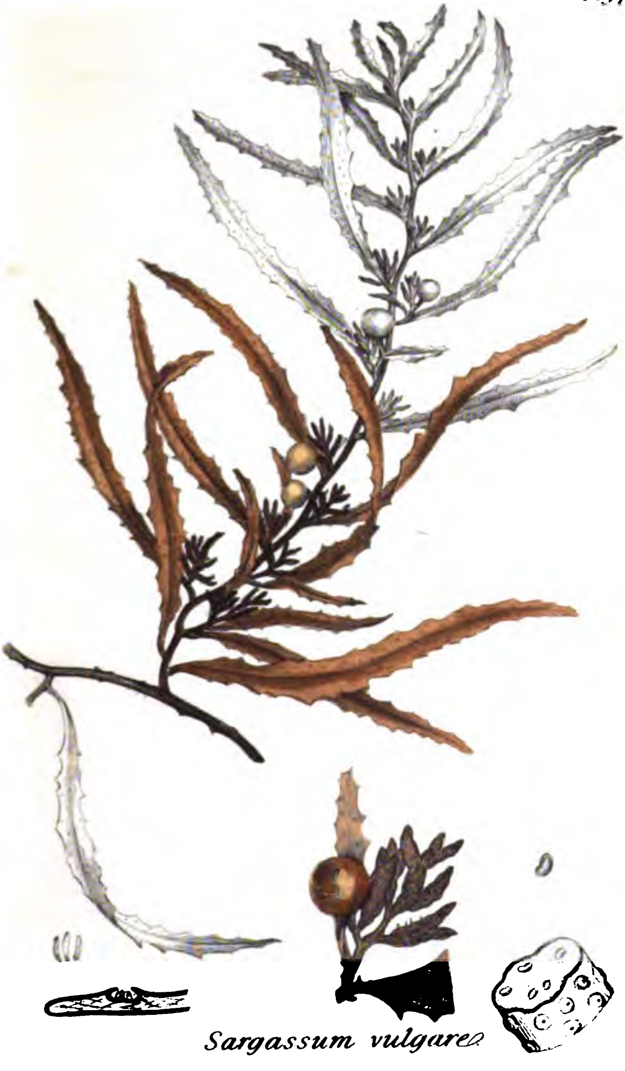
consists of a series of organized beings, apparently of more complex character than the *Gloiocladeæ*, but whose economy is so little understood as to render it doubtful whether they really are of a vegetable nature.

SUBORDER I. INARTICULATÆ.

Plants foliaceous, spreading or filiform, inarticulate (or rarely and only apparently articulated).

2114.

2207



Sargassum vulgare

Feb 1 1810 published by Jas Sowerby London.

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TRIBE I. FUCOIDEÆ.

Marine plants, of an olive-brown or olive-green colour, becoming black on exposure to the air; of a firm coriaceous or ligneous substance and fibrous texture, tearing with facility in a longitudinal direction. Frond with a hard scutate base, furnished in many species with distinct leaf-like processes. Generally furnished with air-vessels, which are either uniform dilatations of particular parts, or distinct bodies supported on little stalks. Fructification, tubercles arranged in distinct receptacles, or imbedded in the frond, and containing dark-coloured sporules surrounded by a pellucid limbus, which escape by a terminal pore.

GENUS DCV. SARGASSUM. *Sargassum. Sea-Grape.*

GEN. CHAR. *Frond* with leaves. *Leaves* stalked, with a midrib. *Air-vessels* simple, axillary, stalked. *Receptacles* small, linear, tuberculated (mostly in axillary clusters or racemes). *Sporules* in distinct cells.

This is an extensive genus, consisting of about seventy known species, all exotic, abounding especially in the warm seas of the tropics, and rarely seen beyond the 40th degree of latitude on either side of the equator, unless as occasional wanderers.

The name is derived from the Spanish *Sargazo*, a term applied to the large masses of certain species which are found floating on the surface of the ocean.

SARGASSUM VULGARE. *Common Sargassum.* TAB. **2207.**

Stem filiform, compressed, pinnated. Leaves linear-lanceolate, serrated. Air-vessels spherical, on flat stalks. Receptacles cylindrical, racemose.

Fucus natans, *Linn.* *Turner Hist. Fuc. tab.* 46. *E. B.* 2114. Sargassum vulgare, *Agardh.* *Greville Alg. Brit.* 2. *tab.* 1. *Hooker Crypt. Part* 1. 264.

Occasionally cast on the shores of the Orkney Islands, being probably wafted thither by the currents from warmer latitudes, as are various other productions from the western shores of the Atlantic. Frond originally fixed by a small callous base. Stems a foot or more in length, alternately pinnated with simple branches. Leaves distichous, alternate, dotted with pores, dark olive-coloured, changing to a reddish brown by exposure to the air. Receptacles cylindrical, generally cloven, rugged with tubercles. Air-vessels nearly as large as a small pea.

This and the following species are confounded by our seamen under the general name of Gulf-weed, from their abundance in the Gulf of Mexico, and the remarkable current flowing round it called the Gulf-stream; and some curious yet unexplained facts in their history seem to have drawn attention to them in the earliest periods of the navigation of the main ocean. The Carthaginians, in thirty days' sail, with an easterly wind, reached the "Weedy Sea," probably the same still called by the Spaniards and Portuguese "Mar do Sargazo," a part of the Atlantic in which the Sargassum floats in such prodigious quantity upon the surface of the water as to impede the course of vessels for days together; the ocean for hundreds of miles presenting the appearance of a vast swamp or inundated meadow, and justifying the fears of the sailors in the first voyage of Columbus, who, observing their slow progress and the increasing quantity of the weed, became alarmed lest, forcing their passage against the will of Heaven in search of an unknown country, their return might be rendered impossible. The accumulation of this weed in the northern Atlantic extends nearly across its whole breadth, beginning on the east at the 30th meridian and reaching the Bahama islands on the west; the greatest quantities being aggregated at its eastern and western extremities, forming as it were two great banks, of which the former is the more extensive, being upwards of 1200 miles from north to south: this it has been observed occupies that part of the ocean where the Gulf-stream terminates, while the western bank occurs where the counter-current of the same stream, which runs along its southern border, unites at the Bahamas with the drift-current of the North Atlantic; thus favouring the popular notion that the Mexican Gulf is the source that supplies the Sargassum, and that the stream in question is the cause of these accumulations; but if so, a similar deposit would necessarily occur about Newfoundland, where the stream is first diverted from its northern course, and has formed the valuable fishing shallows called the Banks of Newfoundland. By whatever law or cause its peculiar distribution is regulated, the Sargassum always retains the position it has occupied time out of mind, and is indeed so undeviating in this, that the Spanish and Portuguese pilots are said often to rectify their longitude by it; and although frequently driven several degrees southwards during the prevalence of the violent north winds at certain seasons, so soon as the disturbing cause has ceased it returns to its original station. Accumulations of a similar kind exist in all the tropical seas on each side of the Line, as in the South Atlantic, the Pacific, and Indian Oceans.

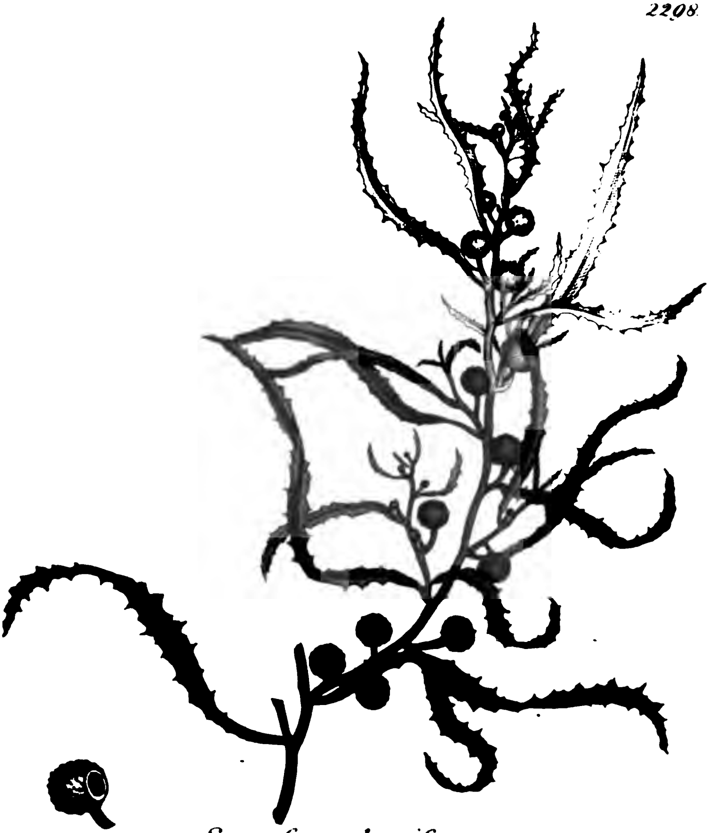
SARGASSUM BACCIFERUM. *Berry-bearing Sargassum.* Tab. **2298.**

Stem filiform, cylindrical, bipinnate. Leaves linear, acute, serrated. Air-vessels spherical, on cylindrical stalks.

Fucus bacciferus, *Turner Hist. Fuc. tab.* 47. *E. B.* 1967. Sargassum

1967

2208.



Sargaſsum bacciferum.

Jan. 1.1809. Publish'd by Jaˢ Sowerby London.

bacciferum, *Agardh. Greville Alg. Brit.* 3. *Hooker Crypt. Part* 1. 264.

Found occasionally, like the last, and often accompanying it, cast ashore on the Orkney Islands; likewise collected by Mr. W. Backhouse at the foot of Castle Eden Dean, Durham. Very much resembling *S. vulgare*, but much more branched, the branches irregular and longer, cylindrical instead of compressed; the leaves more slender and sharply serrated, destitute of pores; the air-vessels generally mucronated. No fructification has hitherto been observed on this species, which would induce the belief that it is a mere variety of the preceding; and comparison of numerous specimens of both from different parts of the globe shows so much variation in their general aspect, and so many scarcely perceptible grades in development, as well nigh to have satisfied me that this is the case.

The different species of Sargassum, especially the most common one, are eaten in many maritime countries of the East, and likewise in Peru and Chili; they are said to make an excellent pickle.

GENUS DCVI. CYSTOSEIRA. *Cystoseira. Bladder-Chain.*

GEN. CHAR. *Frond* with branch-like leaves, becoming more filiform upwards. *Air-vessels* simple, arranged consecutively within the substance of the branch-like leaves. *Receptacles* cylindrical, more or less lanceolate, tuberculated, terminal. *Sporules* in distinct cells.

The species of *Cystoseira*, of which upwards of forty are known, are more widely distributed than those of *Sargassum*, being more independent of climate; they seem, however, to be more abundant in the southern than in the northern hemisphere.

The genus is a grade lower in the scale of organization than the last, the leaves, though described as such, being more truly branches of the frond than are the very distinct appendages to which the term is applied in *Sargassum*, and the air-vessels being integral parts of the branches, instead of separate organs.

The generic name, bestowed by Agardh, who first separated both this and the preceding from *Fucus*, is derived from the Greek *κύστις, a bladder*, and *σειρὰ, a chain*, in allusion to the disposition of the air-vessels, but they are often solitary.

The plants are all of a dark olive-green or brown hue, becoming almost black when dried: they are of a firm, coriaceous texture, and do not adhere to paper in drying. The receptacles are formed by the aggregation of numerous globular cells, containing sporules intermingled with articulated, often clavate filaments*, developed in the substance of the frond near the extremities of the ultimate branches, and causing by their enlargement tubercles on the surface. The little cells are always produced beneath a pore, the opening through which the sporules are eventually discharged. Such pores are not, however, confined to these particular parts, but are found to be dispersed more or less obviously over the whole surface of the frond, not only in this genus, but in all of the true *Fucoideæ*; in many of which their place is marked by little tufts of articulated filaments similar to those accompanying the sporules; a circumstance which appears to indicate that the terminal production of the receptacles is due to the greater concentration of the vital energy of the plant towards its extremities, and takes place only when the latter has attained the utmost limit of its growth for the season†.

The British species of *Cystoseira* are scarcely ever met with except along the southern coast.

CYSTOSEIRA GRANULATA. *Granulated Cystoseira.* TAB. **2299.**

Frond cylindrical. Stem bearing elliptical knobs, each producing a filiform, repeatedly dichotomo-pinnated branch, furnished with remote subulate spines. Air-vessels elliptico-lanceolate, two or three connected together. Receptacles elongated.

Fucus granulatus, *Linn.* *Turner Hist. Fuc. tab.* 251. *E. B.* 2169. Cystoseira granulata, *Agardh Sp. Alg.* 1. 55. *Greville Alg. Brit.* 5. *tab.* 2. *Hooker Crypt. Part* 1. 265. Fucus mucronatus, *Turner Syn. Fuc.* 73. F. fœniculaceus, *Gooden. and Woodw. Linn. Trans.* 3. 134.

Found in rocky pools left by the receding tide, chiefly in Devonshire and Cornwall, and about Bantry Bay and other places in the south of Ireland. Frond fixed by a hard flattish disc. Stem cylindrical, in old plants as thick as a goose-quill, more or less rugged with elliptical knobs, from which the branches proceed; the latter, when young, are flat, entire, linear and somewhat leaf-like, with a midrib, eventually becoming filiform, and variously divided in a dichotomous manner, the whole set at distant intervals with small, sharp spines. Air-vessels solitary or two or three together, sometimes confluent. Receptacles acuminate, or rather the tubercles do not extend quite to the extremity of the branch. Perennial. Fructification in the summer.

The chief distinctive character of the species consists in the bulb-like bases of the principal branches, which are not met with in any other native species, the very equivocal *C. barbata* excepted.

CYSTOSEIRA ERICOIDES. *Heath-like Cystoseira.* TAB. **2300.**

Frond cylindrical, branched, everywhere closely beset with very short

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[*] See Tab. 2299, *C. granulata.*

[†] See *Fucus*, and especially the transverse sections magnified in *F. ceranoides* and *F. serratus*, Tab. 2308 and 2309.

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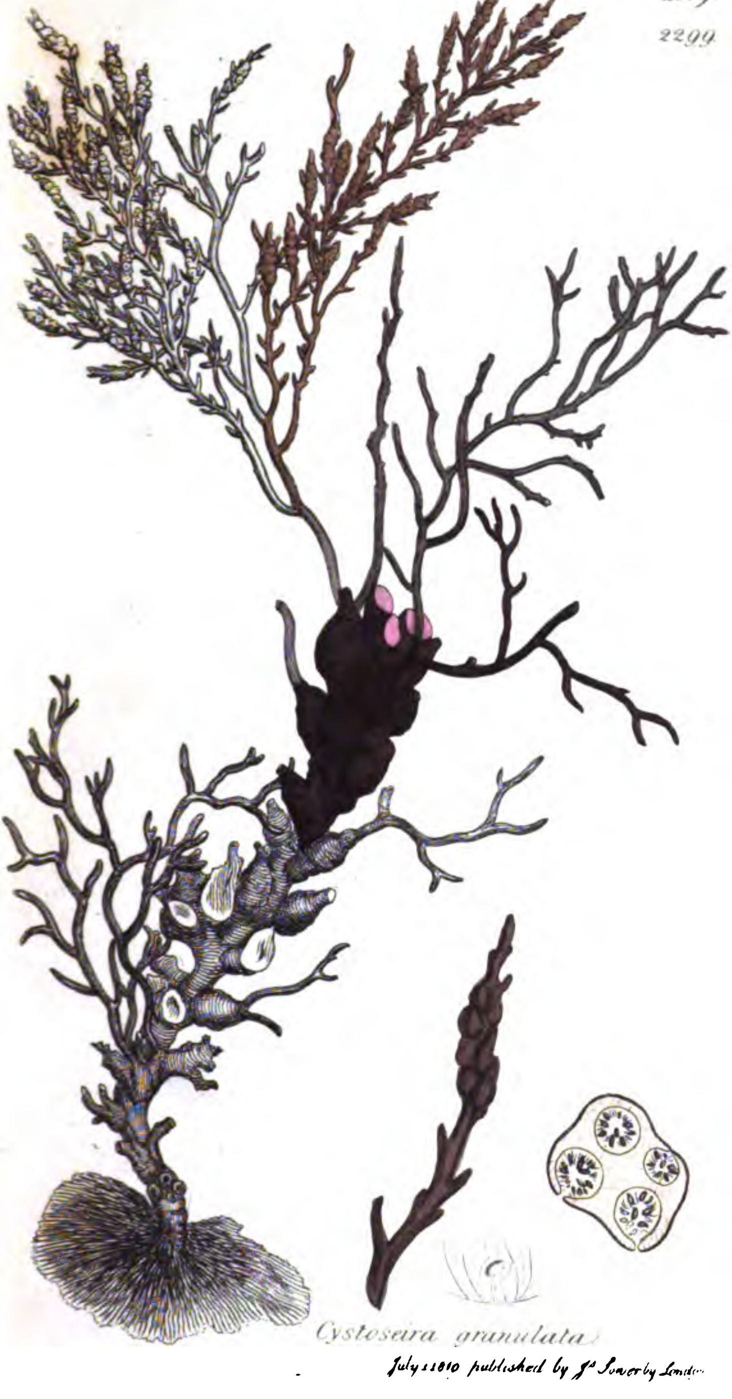
2299.



Cystoseira granulata

July 1 1810 published by Jas Sowerby London

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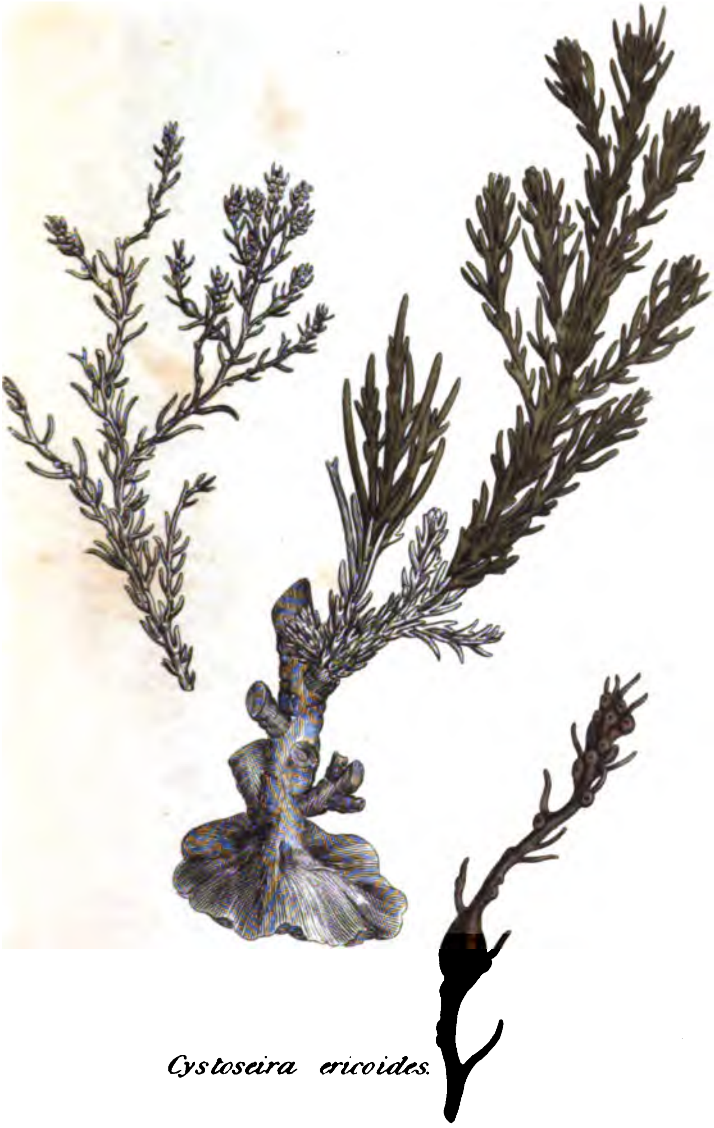
2300



Cystoseira ericoides.

Jan. 1. 1809. Published by Jas. Sowerby, London.

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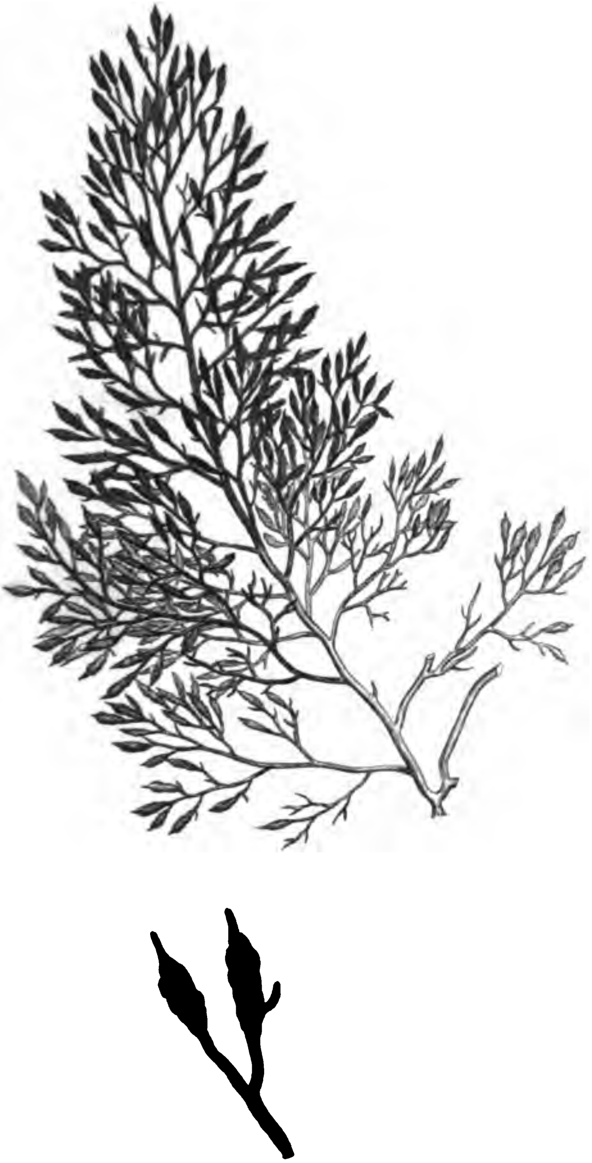
2301.



Cystoseira barbata.?

July 1 1810 published by J.s Sowerby London

subulate leaves or branchlets. Air-vessels elliptical, solitary. Receptacles swelling at the base of the terminal spines.

Fucus ericoides, *Linn.* *Turner Hist. Fuc. tab.* 191. *E. B.* 1968. Cystoseira ericoides, *Agardh Spec. Alg.* 1. 52. *Greville Alg. Brit.* 4. *Hooker Crypt. Part* 1. 265. Fucus tamariscifolius, *Hudson. Stackhouse.* F. selaginoides, *Linn. Mant. Turner. Syn. Fuc.* 85.

Frequent on marine rocks on the south-west coast of England and south of Ireland, but rare elsewhere. Frond about a foot high, fixed to the rock by a firm orbicular disc, very densely branched; the stem and principal branches stout and cylindrical, the smaller ones slender or filamentous. The lower branches bear crowded, narrow, linear leaves or ramuli, nearly flat, and from half an inch to an inch long, some of them cut and pinnatifid; these disappear by age, or rather become more or less elongated and converted into cylindrical branches, closely beset with awl-shaped, spine-like ramuli, the state in which the whole plant is generally found at the time of fructification. The air-vessels are solitary, elliptical distensions of the substance of the ultimate branches. Fructification scarcely receptacular, the tubercles being rather individual distensions of the bases of the spine-like ramuli: it is met with in the summer and autumn. Perennial.

It appears to me that the lower part of the stem is of indefinite duration, throwing out the flattened branches above described during one season, which produce fructification the second; the whole plant being often found in the summer in the fructified state, without any trace of the younger shoots, has induced some botanists to regard it as a biennial.

"This plant possesses, in common with some other species, but in a prominent degree, the property of being iridescent when in a growing state beneath the surface of the water: and so striking and extraordinary is the beautiful appearance thus produced by the reflection of bright glaucous and other tints, that every botanist who beholds it for the first time is deceived by it."—*Greville.*

CYSTOSEIRA BARBATA. *Bearded Cystoseira.* TAB. 2301.

Frond cylindrical. Stem bearing elliptical knobs, each producing a branch many times dichotomo-pinnate and filiform. Air-vessels lanceolate, chain-like. Receptacles ovato-elliptical, mucronate.

Fucus barbatus, *Gooden. and Woodw. in Linn. Trans.* 3. 128. *Turner Hist. Fuc. tab.* 250. *E. B.* 2170. Cystoseira barbata, *Agardh Sp. Alg.* 1. 57. *Greville Alg. Brit.* 6. *Hooker Crypt. Part* 1. 265. Fucus granulatus, *Gooden. and Woodw. in Linn. Trans.* 3. 131. (exclud. the syn.)

Said to have been gathered by Mr. Hudson on the coast of Devonshire, but never found in our seas by any other botanist. Frond a foot or more in length. Stem about the thickness of a goose-quill, two or three inches long, with numerous paniculated branches, the ultimate ones forked, often twisted. Receptacles abundant, tipt with a setaceous point.

CYSTOSEIRA FŒNICULACEA. *Fennel-leaved Cystoseira.* TAB. 2302.

Frond compressed. Stem destitute of tuberous knobs; branches more or less rough with little hard points, repeatedly pinnate, filiform. Air-vessels solitary or two together. Receptacles mostly proceeding from the terminal air-vessels, linear-lanceolate or furcate.

Fucus abrotanifolius, *Linn.* *Turner Syn.* 66. *E. B.* 2130. Cystoseira fœniculacea, *Greville Alg. Brit.* 6. *Hooker Crypt. Part* 1. 265. C. abrotanifolia, *Agardh Sp. Alg.* 1. 63. Fucus fœniculaceus, *Linn.* *Turner Hist. Fuc. tab.* 252.

Frequent on the south and south west coasts of England. Frond from 12 to 18 inches long, fixed by a hard, somewhat conical base. Stem short, almost cylindrical; branches compressed, slender, subdistichous, alternately pinnate, the pinnæ two or three inches long at the base, shorter upwards, each dividing in a similar pinnated manner into two or three series of smaller ramuli. Air-vessels elliptical-oblong, chiefly towards the extremity of the pinnæ and their ramuli. Receptacles subcylindrical and simple, or forked and more flattened; generally produced immediately at the extremity of the terminal air-vessels, sometimes apparently stalked by the contraction of an intervening portion of the frond.

Perennial, producing its fructification in the summer and autumn.

The following, *C. discors*, has been often described as a different species, but it is undoubtedly only the young state of the present.

CYSTOSEIRA DISCORS. *Discordant Cystoseira.* TAB. 2303.

Fucus discors, *Linn.* *Turner Syn.* 70. *E. B.* 2131. Cystoseira discors, *Agardh Sp. Alg.* 1. 62.

Mrs. Griffiths, to whom the submarine botany of England is so much indebted, was the first who ascertained, by repeated observations on the coast of Devonshire, that this supposed species is no other than *C. fœniculacea*, as it appears in the early part of the summer, or in a young state, particularly when growing in places scarcely ever left exposed by the tide; in which case the branches present the appearance of flat, pinnated leaves, more or less obscurely midribed, dotted, and with a serrated or denticulate margin.

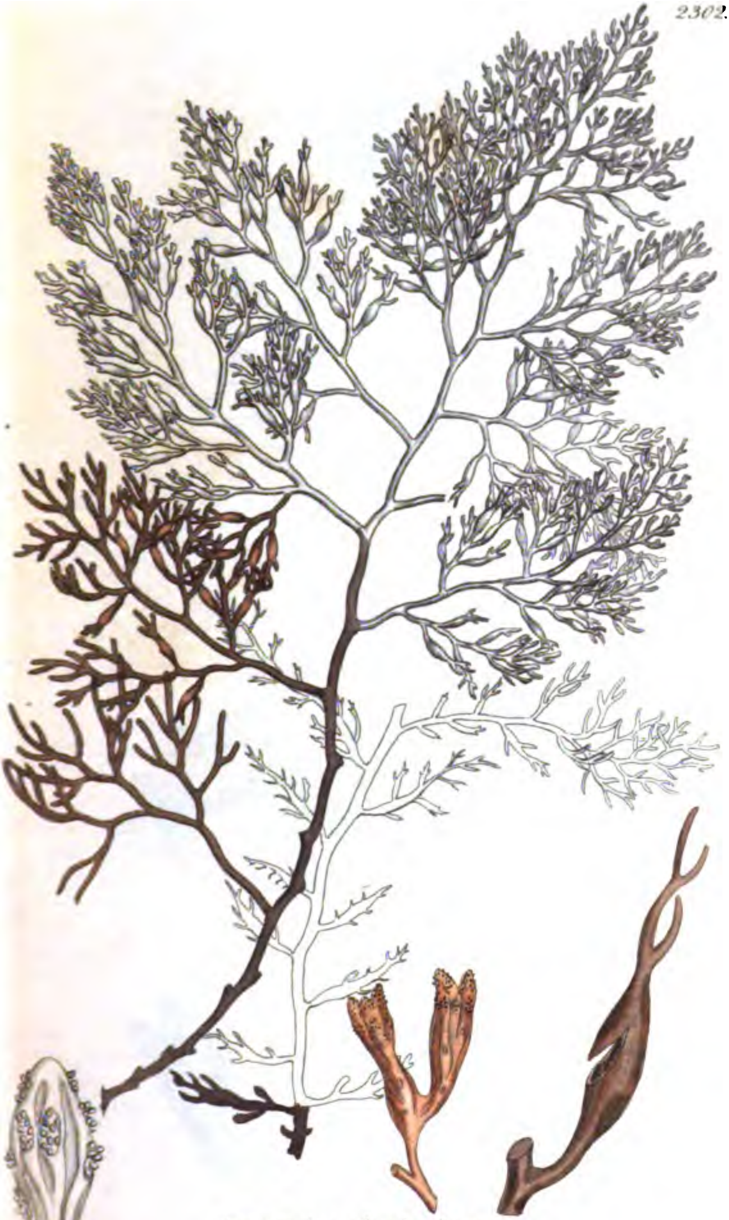
Mrs. Griffiths observed that in all the plants found late in the autumn or in winter, as well as those from shallow pools at all seasons, the leaves or branches are more slender, and the parts of fructification smaller, but the resemblance in every other respect between this and the preceding is perfect. In winter, when the sporules are scattered, the decaying parts fall off, but the branches often continue to lengthen, and make vigorous shoots. Soon after the fruit begins to appear, and the sporules are in a progressive state until the autumn following. The presence of fructification in both states of the plant seems to have led to their reference by earlier botanists to two distinct species.

CYSTOSEIRA FIBROSA. *Fibrous Cystoseira.* TAB. 2304.

Frond bushy, very much branched; branches filiform, the terminating

2130

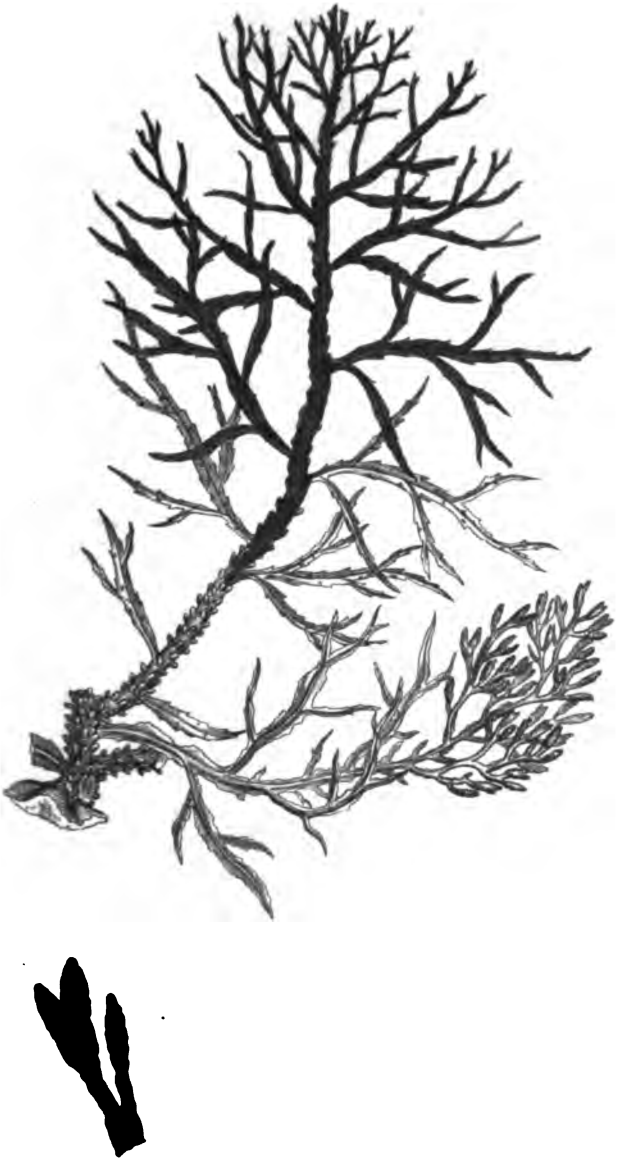
2302.



Cystoseira fœniculacea.

Mar. 1 1811 published by [illegible] London.

2131
2303.

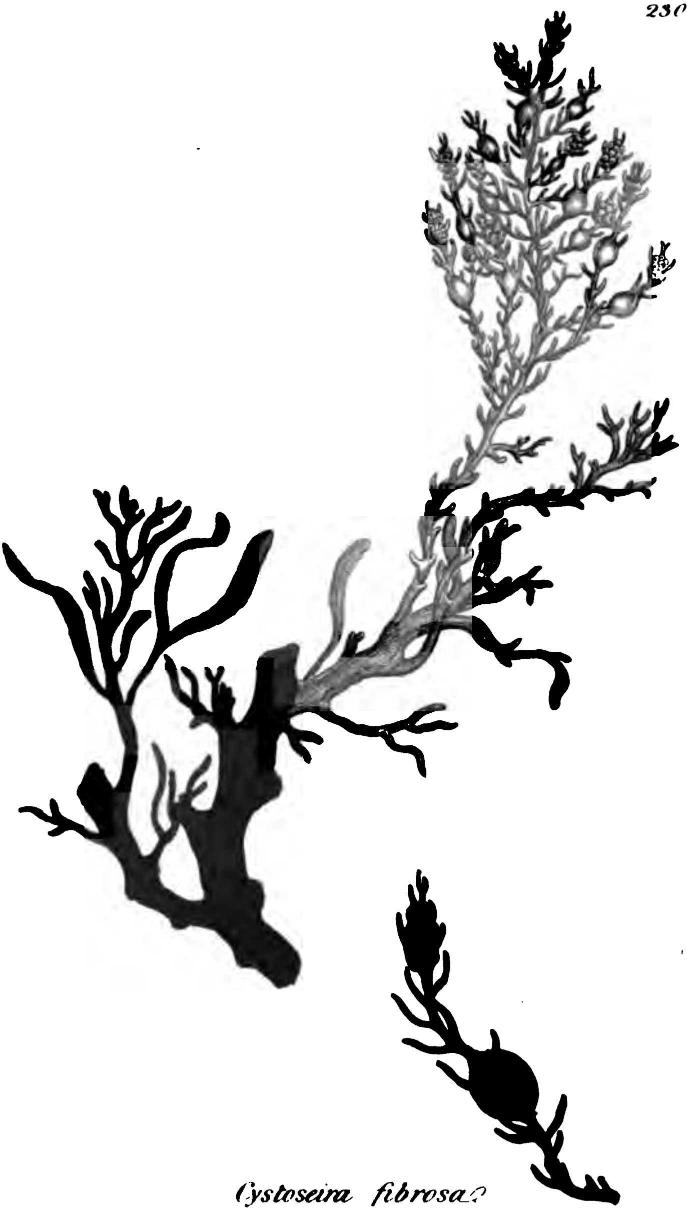


Cystoseira discors.

Mar 1 1810 published by Js Sowerby London

1969

2304.



Cystoseira fibrosa?

[illegible] Sep. Publish'd by Jas. Sowerby London.

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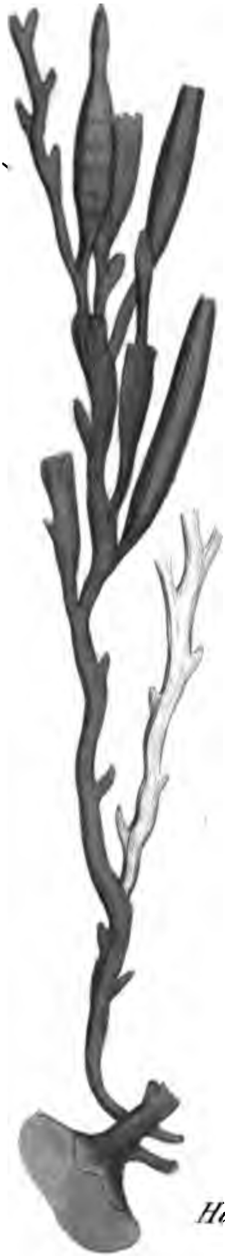
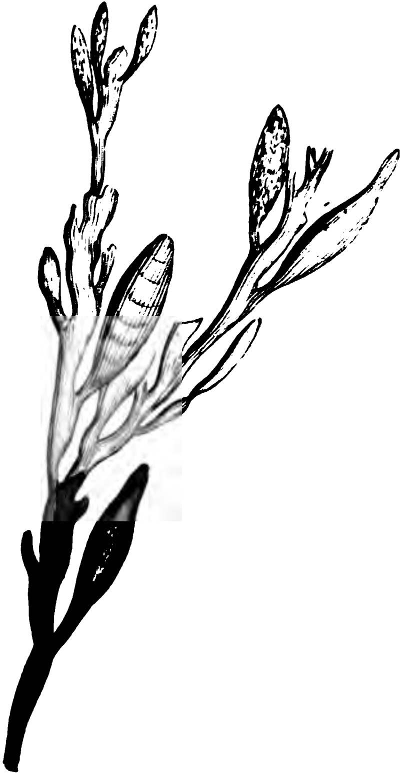
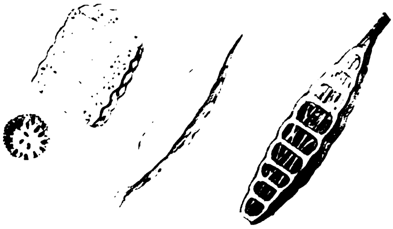
2305.







Halidrys siliquosa.

branchlets or leaves linear, plane. Air-vessels elliptical, mostly solitary. Receptacles filiform, much elongated.

Fucus fibrosus, *Hudson. Turner Hist. Fuc. tab.* 209. *E. B.* 1969. Cystoseira fibrosa, *Agardh Sp. Alg.* 1. 65. *Greville Alg. Brit.* 8. *Hooker Crypt. Part* 1. 266.

Found all along the southern coast of England, but rarely towards its eastern extremity, as well as at Dover, Yarmouth, and on the Yorkshire shores. Frond fixed by a hard spreading base, one to three feet in length. Stem nearly cylindrical, of the thickness of a large quill; branches distichous, alternate, the ultimate divisions simple or furcate, plane, linear-setaceous. Air-vessels about the size of a vetch-seed, roundish-elliptical or oblong, mostly solitary, but sometimes two or three in succession on the same branchlet. Receptacles often an inch or more in length, simple or furcate, rough with the small, closely-set tubercles, which are intermingled with small, flat, bristle-like leaves or ramuli.

Perennial. Fructification in the summer.

The young plant, and sometimes the lowermost branches of old ones, is furnished with flat, midribed, leaf-like processes, an inch or two in length, and of a lighter hue than the older divisions of the frond.

GENUS DCVII. HALIDRYS. *Halidrys. Sea-Tree.*

GEN. CHAR. *Frond* compressed, coriaceous, linear, pinnated, with distichous branches. *Air-vessels* lanceolate, stalked, divided by transverse septa. *Receptacles* lanceolate, stalked, compressed. *Sporules* in distinct cells.

The stalked air-vessels and fructification, the transverse divisions of the former and the solidity of the latter, the masses of sporules being included in cells instead of lying loose in the common mucus of the receptacle, distinguish the only known species of this genus from *Fucus.*

The name, from ἅλς, *the sea*, and δρῦς, *a tree*, was bestowed upon it by Lyngbye, on account of the beautiful shrub-like appearance which it presents when growing erect in the water.

HALIDRYS SILIQUOSA. *Podded Halidrys.* TAB. 2305.

Fucus siliquosus, *Linn. Turner Hist. Fuc. tab.* 159. *E. B.* 474. Halidrys siliquosa, *Lyngbye Hydroph. Dan.* 37. *Greville Alg. Brit.* 9. *tab.* 1. *Hooker Crypt. Part* 1. 266. Cystoseira siliquosa, *Agardh Sp. Alg.* 1. 72. *Greville Fl. Edin.* 285.

One of the most common and abundant of our native Algæ, being met with on almost every part of our coast. Frond fixed to rocks or stones in the sea by a hard, concave, conical disc, from one to four feet long. Stem compressed, much and alternately branched, the divisions all distichous, simple, or, rarely, again divided, bearing on each side, alternately, and at short intervals the pod-like air-vessels that give name to the species. These latter are supported on short footstalks, are generally about an inch long, linear-lanceolate, compressed, and terminate in a flat, linear beak of variable length; they are divided internally into several cells by transverse dissepiments, each of which causing a slight stricture on the outside gives them the appearance of being jointed; the cells have generally a few slender white fibres crossing their cavity longitudinally. The receptacles very much resemble the air-vessels in form, and have the same distichous arrangement, but are solid, and their surface is granulated with small tubercles, each tipped with a minute pore through which the sporules are discharged when ripe.

Apparently perennial. Fructification late in the autumn. The species varies greatly in some situations in regard to the thickness or breadth of its branches and the production of its pods and air-vessels.

Genus DCVIII. FUCUS. *Fucus.*

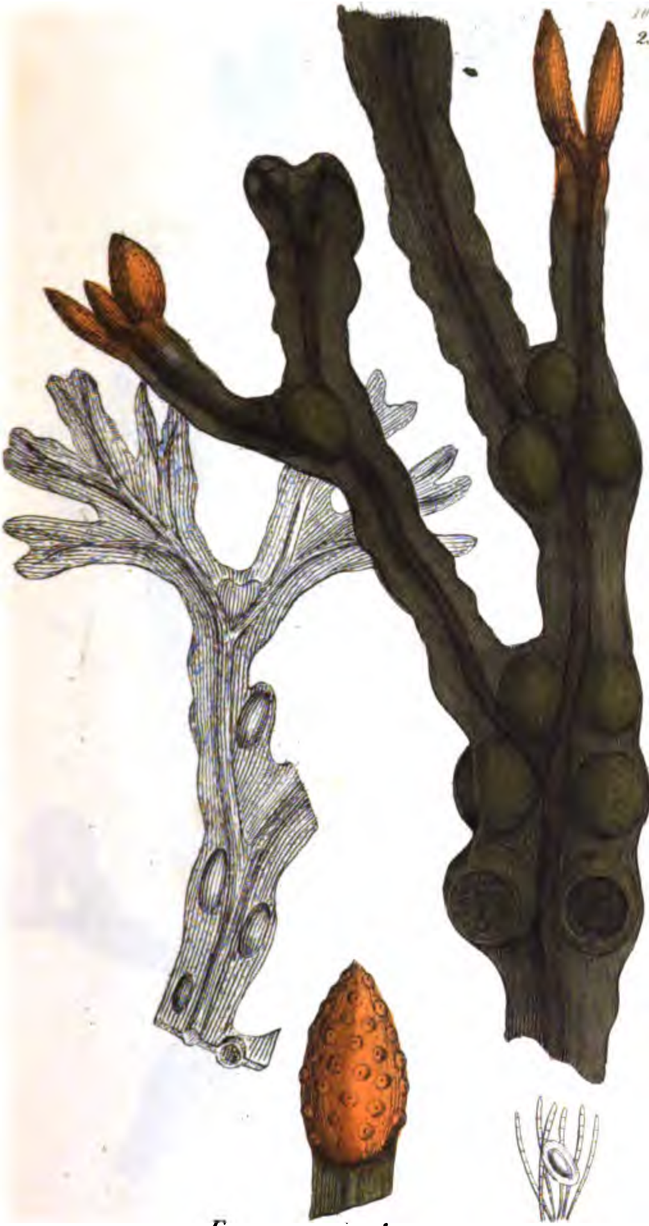
Gen. Char. *Frond* plane, compressed, or cylindrical, linear, dichotomous, coriaceous. *Air-vessels*, when present, innate in the frond, simple, large. *Receptacles* terminal (except in *F. nodosus*), turgid, containing tubercles imbedded in mucus, and discharging their sporules by conspicuous pores.

This genus, in which Linnæus and his successors, until a comparatively recent date, included by far the greater proportion of the Inarticulated Algæ, has been so much reduced and circumscribed by later botanists, that scarcely more than a dozen known species will arrange under the above character. Although ranking as the type of a tribe including the most complex forms of the order, the plants belonging to it are undoubtedly lower in the scale of vegetable being than those of the preceding genera; this is especially manifested in the fructification, the sporuliferous masses lying loose in the mucous contents of the receptacle, in place of occupying the distinct cells which characterize that of *Sargassum*, *Cystoseira*, and *Halidrys*.

The frond varies in development, in some species being leaf-like, and furnished with a midrib; others have it more or less compressed, but without any foliaceous expansion or midrib; others are cylindrical. Air-vessels are frequently wanting, the plants being so organized as to retain an erect position in the water without their aid; where present, they are simple globular or elliptical cavities formed in the substance of the frond, apparently by the separation at those particular parts of the double membrane composing it. A similar separation

1066

2306.

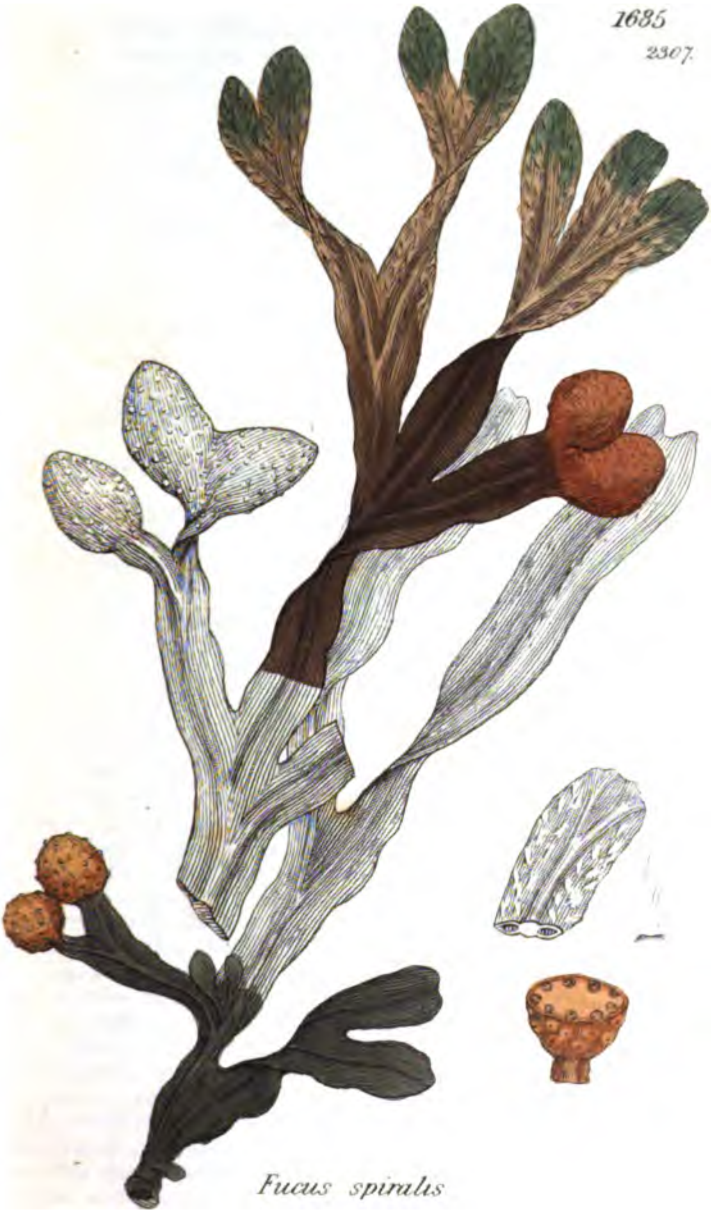


Fucus vesiculosus.

Sept.r 1. 1802. Published by Jas. Sowerby, London

1685

2307.



Fucus spiralis

Dec.r 1.1806. Publish'd by Ja.s Sowerby, London .

taking place at the extremities of the frond, or, in *F. nodosus*, of some of its lateral branches, is the origin of the receptacles of fructification, which, when ripe, are turgid with mucus secreted in the cavity; when the sporules are discharged through the pores, this mucus flows out with them, leaving the receptacles limp, when they gradually decay and fall off. The sporuliferous masses are accompanied by jointed filaments, like those found in *Cystoseira*, and the pores on the surface of the frond, from which little tufts of similar filaments frequently extend, are very conspicuous in many species of *Fucus*.

The plants are all perennial, of a tough, coriaceous substance, and fixed by a firm, more or less scutate base. They do not adhere to paper in drying. The genus in its present limited state is exclusively extra-tropical, and seems chiefly to abound in the northern hemisphere between the latitudes of 40° and 55°.

The name is Greek, φῦκος, *sea-weed.*

* *Frond plane, foliaceous, with a midrib.*

FUCUS VESICULOSUS. *Bladder Fucus.* TABS. **2306** and **2307.**

Frond foliaceous, plane, linear, dichotomous, midribed; margin quite entire. Air-vessels subspherical, mostly in pairs. Receptacles terminal, mostly elliptical, turgid.

Fucus vesiculosus, *Linn. Turner Hist. Fuc. tab.* 88. *E. B.* 1066. *Greville Alg. Brit.* 12. *tab.* 2. *Fl. Crypt. tab.* 319. *Hooker Crypt. Part* 1. 267. *Agardh Sp. Alg.* 1. 87.

Common and most abundant on all rocky shores, likewise in tide rivers where the water is brackish, and in salt-marshes, presenting a variety of appearances in different situations, which Linnæus and other botanists, by whom the structure of the Algæ was very imperfectly understood, regarded as distinct species. Frond often three or four feet long, fixed by a hard flat scutum of a dark olive-green colour, passing into a tawny yellow at the extremities; furnished with a midrib, repeatedly dichotomous; margins entire, more or less waved; whole surface dotted with pores bearing filaments. Air-vessels about the size of a large pea, occasionally confluent; mostly arranged in pairs, or opposite to each other on each side of the midrib, and generally an odd one in the angles of the dichotomous branches. Receptacles terminal, more or less elliptical and compressed, solitary or in pairs. Fructification in the autumn.

Known on the coast of England by the name of Sea-wrack. It forms the chief mass of the weed thrown on shore in stormy weather, and collected by the farmers for the purpose of manure. Its ashes constitute the alkaline substance known by the name of kelp (hence its northern appellation of Kelp-ware); the manufacture of which during the late long war gave employment to many thousands of persons in the Scottish Islands, and on the northern and western shores of Scotland, and the north of Ireland, but is now much deteriorated in consequence of the reduction and repeal of the duties on barilla and common salt: the ashes contain about half their weight of pure alkali, hence the value of the kelp for various manufactures, particularly those of soap and glass. In the Hebrides, according to Dr. Greville, the inhabitants cover their cheeses with these ashes in lieu of salt; they likewise use the plant recently collected as winter fodder for their cattle, and occasionally in a dry state for fuel. Linnæus informs us that in Gothland, in Sweden, the people boil the plant in water, and, mixing it with a little coarse meal, feed their hogs upon it; hence they have given it the name of Swin-tang.

The ripe receptacles, cut open, are applied as a domestic dressing to scrofulous wounds with considerable efficacy, an effect probably due to the iodine contained in the mucus; indeed that valuable medicinal substance is chiefly obtained from this species of *Fucus*: the quantity yielded by it however varies in different localities, and seems from the experiments of Sir H. Davy to depend in some degree on climate; that from the coast of France yielding considerably more than the British weed, while a still larger proportion than is afforded by any European species is obtainable from plants of the same family vegetating in the seas of warmer latitudes.

F. vesiculosus is very variable in size and habit, according to the station it occupies, and it is the least dependent on locality of all the marine Inarticulated Algæ, some of the *Ulvaceæ* alone excepted, neither requiring constant, nor even regularly periodical submersion, nor water positively salt to the taste to ensure its vegetation. The following are the most marked deviations from the normal state:—

β. spiralis. Frond spirally twisted. Air-vessels none. Receptacles roundish. Fucus spiralis, *Linn.* *E. B.* 1685. See Tab. **2307.**

γ. linearis. Frond narrow, dwarfish. Air-vessels none. Receptacles long, between linear and lanceolate. Fucus distichus, *Lightfoot.*

δ. balticus. Frond densely tufted, very dwarf, yellow-brown, with an indistinct midrib, and destitute of air-vessels and receptacles. Fucus balticus, *Agardh in Svensk Bot. tab.* 576. *Greville Crypt. Fl. tab.* 181.

The last is found in salt-marshes and sands occasionally flooded by the sea, in the Western Highlands and Islands of Scotland.

FUCUS CERANOIDES. *Buck's-horn Fucus.* TAB. 2308.

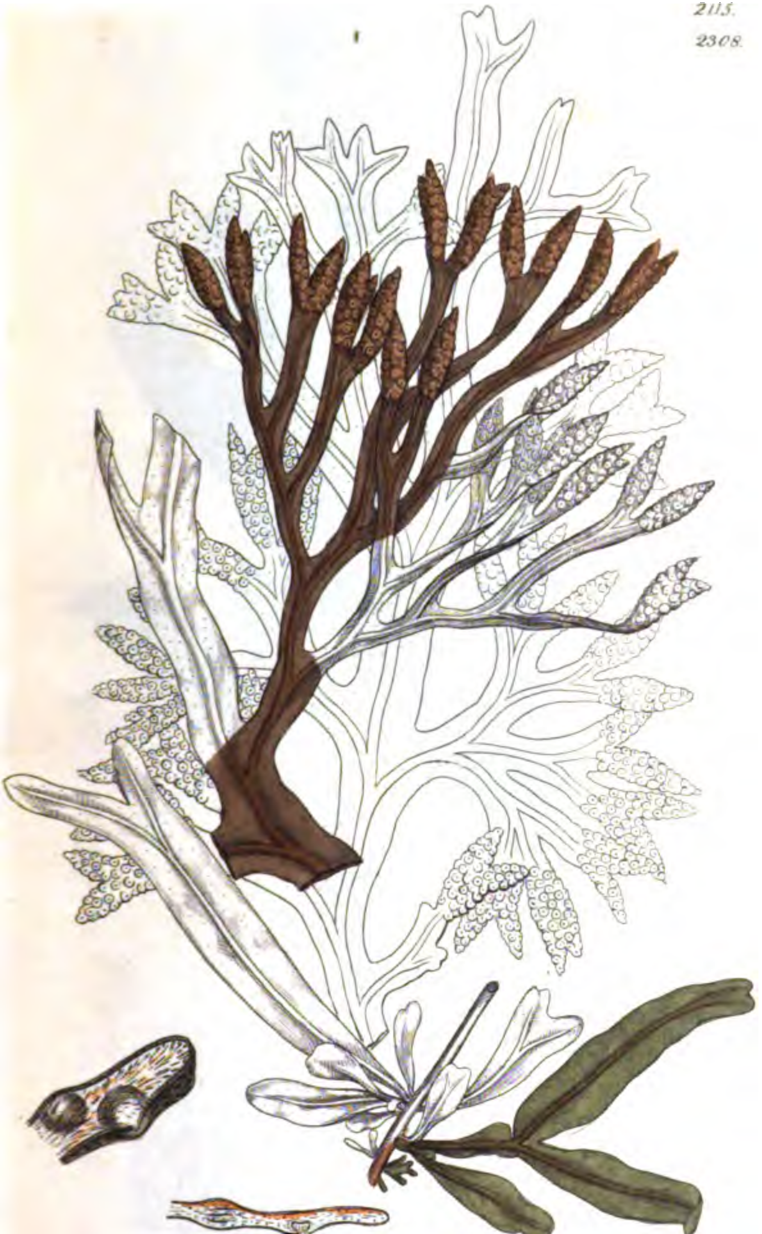
Frond coriaceo-membranaceous, flat, linear, subdichotomous, midribed; pinnated with narrow, lateral, scattered, multifid, spreading, fruit-bearing branches. Air-vessels none. Receptacles terminal, subcylindrical, linear acuminated.

Fucus ceranoides, *Linn.* *Turner Hist. Fuc. tab.* 89. *E. B.* 2115. *Greville Alg. Brit.* 14. *Hooker Crypt. Part* 1. 267. *Agardh Spec. Alg.* 1. 93.

Comparatively rare on the coast of England, but plentiful in the North, and "especially in the sheltered bays and inlets on the west coast of Scotland, often half imbedded in sand."—*Hooker.*

2115.

2308.

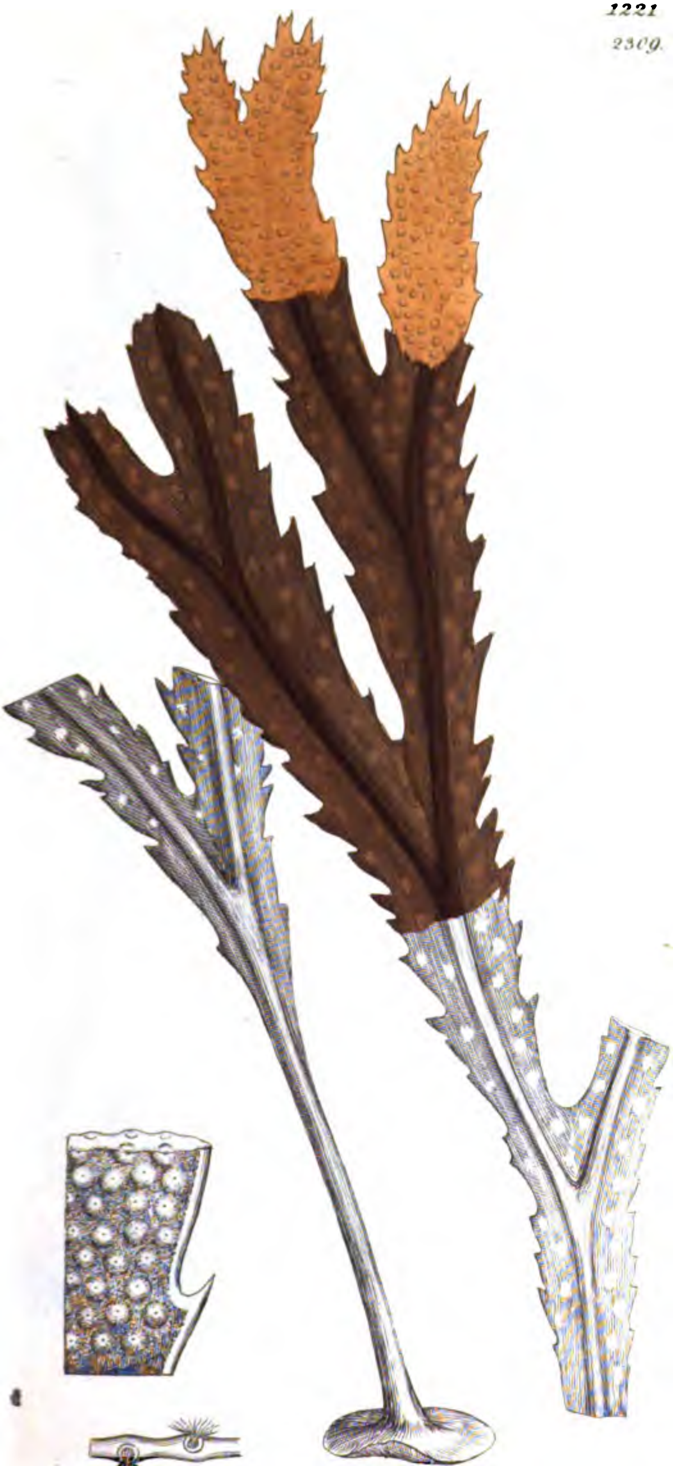


Fucus ceranoides.

Drawn and colored by J^s. Sowerby London.

1221

2309.



Fucus serratus.

Octr 1. 1803. Published by Jas Sowerby. London.

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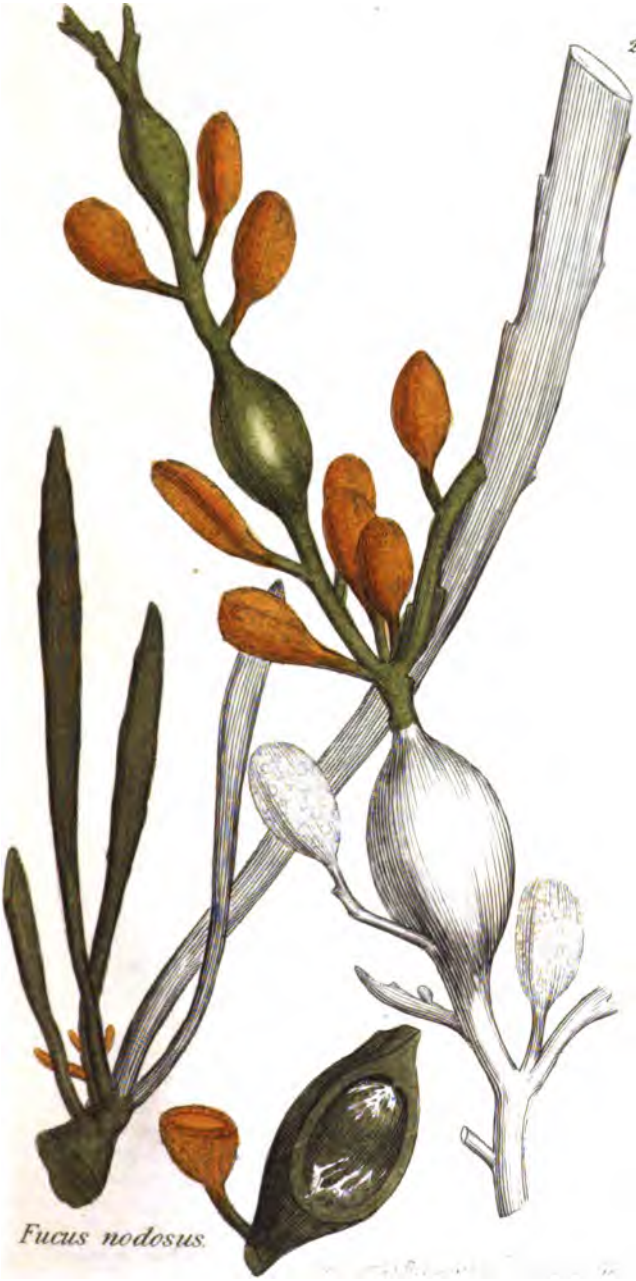
2310.



Fucus nodosus.

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Frond from a few inches to a foot and a half in length, frequently, but irregularly, dichotomous, the terminations more or less palmate; olive-green with a tinge of red or yellow at the extremities: becoming black in drying like the rest of the genus. Receptacles terminal, but on alternate, flabelliform, lateral branches, narrower than the sterile divisions of the frond. Fructification in the summer.

There is some general resemblance between this and *F. vesiculosus*, but it is of a thinner substance, and differs greatly in its mode of branching. It is destitute of proper air-vessels; and the occasional inflation of the extremities of the sterile branches seems rather to be an abortive effort to fructify, than the effect of any tendency to produce them. The surface is sprinkled with pores, from which issue the little tufts of articulated filaments so frequent in these plants.

FUCUS SERRATUS. *Serrated Fucus.* TAB. 2309.

Frond flat, broadly linear, dichotomous, midribed, serrated. Receptacles flat, solitary, terminating the branches, of which they are simply continuations.

Fucus serratus, *Linn.* *Turner Hist. Fuc. tab.* 90. *E. B.* 1221. *Greville Alg. Brit.* 15. *Hooker Crypt. Part* 1. 267. *Agardh Spec. Alg.* 1. 95.

Nearly as abundant on all the rocky parts of the coast as *F. vesiculosus*. Frond from two to four, or sometimes even six feet in length, generally about an inch in breadth, very coarsely and sharply toothed or serrated, tough, almost coriaceous; without any air-vessels, but speckled all over with filament-bearing pores. The receptacles are of a yellowish hue, and formed by a comparatively slight thickening of the ultimate forks of the frond; they are toothed like the other parts, chiefly differing by their colour and rough surface arising from the formation of tubercles beneath the pores, as in *F. vesiculosus*.

This species varies much in the breadth of the frond, the upper segments of which are sometimes between two and three inches across; and likewise in the marginal serratures, which are occasionally almost obsolete. It is collected by our fishermen, and employed in common with the last species as a packing for crabs and lobsters; but the Dutch are said to reject *F. vesiculosus* for this purpose, on account of the greater quantity of mucus contained in its receptacles rendering it apt to putrefy. *F. serratus* forms a large proportion of the sea-weed used as manure, but it contains much less salt than *F. vesiculosus*, and is therefore unproductive in kelp. In Norway cattle are fed with it.

** *Frond plane or compressed, without a midrib.*

FUCUS NODOSUS. *Knotted Fucus.* TAB. 2310.

Frond compressed, without a midrib, irregularly somewhat pinnately branched. Air-vessels solitary, at remote intervals. Receptacles lateral, distichous, stalked, large, subpyriform.

Fucus nodosus, *Linn.* *Turner Hist. Fuc. tab.* 91. *E. B.* 570. *Greville Alg. Brit.* 16. *Hooker Crypt. Part* 1. 268. *Agardh Spec. Alg.* 1. 85. Halidrys nodosa, *Lyngbye.* *Gaillon.*

Common on most rocky shores, especially in the North. The fronds, fixed by a comparatively small, hard, conical disc, grow in a tufted manner to the length of from two to six feet, bearing irregular, more or less distantly pinnated and distichous branches, set on each side with small distichous teeth, in the axils of which the receptacles and smaller branches have their origin. Air-vessels from an inch to an inch and a half long, oval, tapering at each extremity, into the frond of which they are inflated portions. Receptacles orange-yellow when ripe, oblong or roundish, often an inch long, supported on a little flattened stalk, springing from the axils of the serratures promiscuously over the whole frond, mostly solitary, but occasionally two or three together. Fructification in the winter and spring months.

This is the toughest and most coriaceous of the genus, in substance being almost woody. It is said to be preferable to any other species for the manufacture of kelp, and in the Hebrides has the name of Kelp-wrack: it is however known on different parts of the coast by several others, as Yellow-tang, from the colour of the receptacles; Knob-tang, from the very conspicuous appearance of the large air-vessels, and more frequently in England by that of Sea-whistles, from the use to which children convert the latter by cutting them in a particular manner.

"*Polysiphonia fastigiata* is parasitic upon it, and indeed rarely to be found elsewhere."—*Greville.*

FUCUS MACKAII. *Mr. Mackay's Fucus.* TAB. 2311.

Frond nearly cylindrical, subcompressed, slender, dichotomous. Air-vessels elliptical, solitary.

Fucus Mackaii, *Turner Hist. Fuc. tab.* 52. *E. B.* 1927. *Greville Alg. Brit.* 17. *Hooker Crypt. Part* 1. 268. *Agardh Spec. Alg.* 1. 87. F. nodosus, var. γ. Mackaii, *Agardh Syst. Alg.* 275. *Sprengel.*

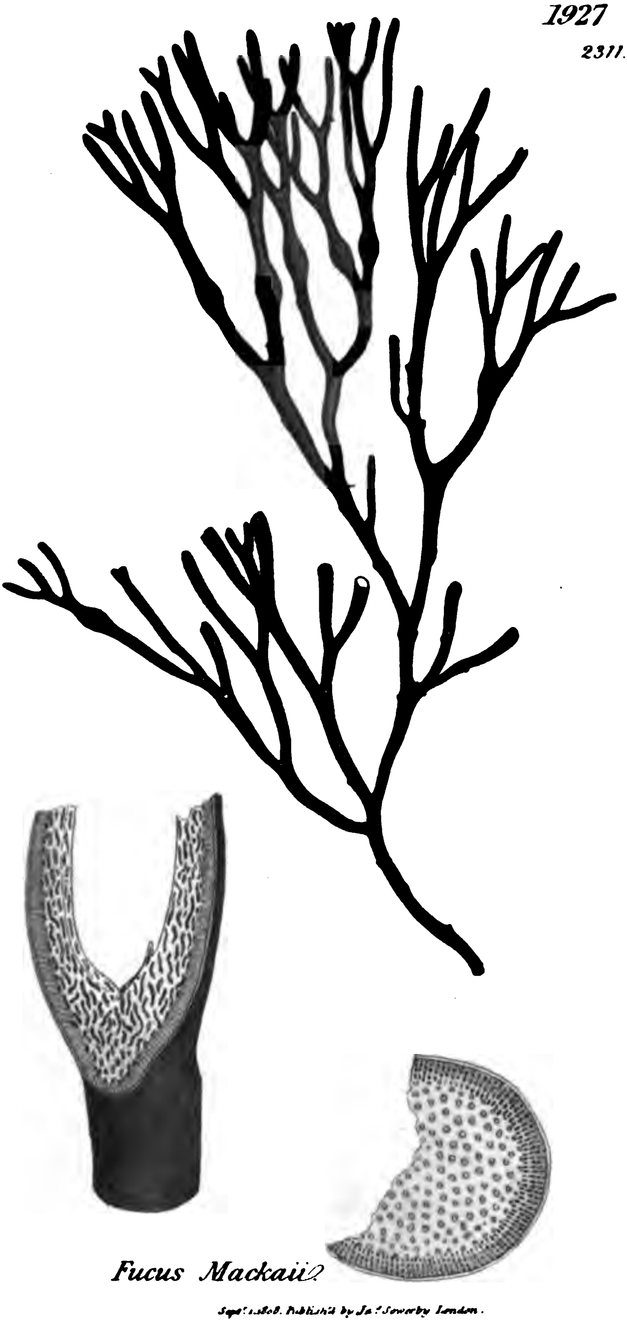
First noticed as a British species by Mr. J. T. Mackay, who met with it in a sheltered bay on the sea-shore of Cunnemara, Ireland: it has since been found in various places in Scotland and the islands, but never in fructification; a circumstance that favours the opinion of its being a mere variety of *F. nodosus*; if so however, it is a very remarkable one. The frond seems never to have been found attached; it varies from six inches to a foot in length, and is repeatedly dichotomous with patent branches, compressed in the lower parts, but with the ultimate divisions subfiliform and cylindrical. The air-vessels are sparingly distributed, and about twice the thickness of the part of the frond of which they are dilatations.

"I once saw the sea-beach in the Isle of Skye covered with it to the extent of an acre in one place, and presenting a most deceitful surface; for the sea had left the whole mass apparently growing in an erect manner, bristled with the tops of the filiform branches, and completely concealing a dangerous muddy shore that lay beneath. As I could never find it actually growing, it is probably an inhabitant of deep water, and to that cause may be in part attributed its very peculiar appearance."— *Greville.*

Magnified sections of the frond and air-vessel are shown in our figure.

1927

2311.



Fucus Mackaii?

Sept.r 1.1808. Publish'd by Ja.s Sowerby London.

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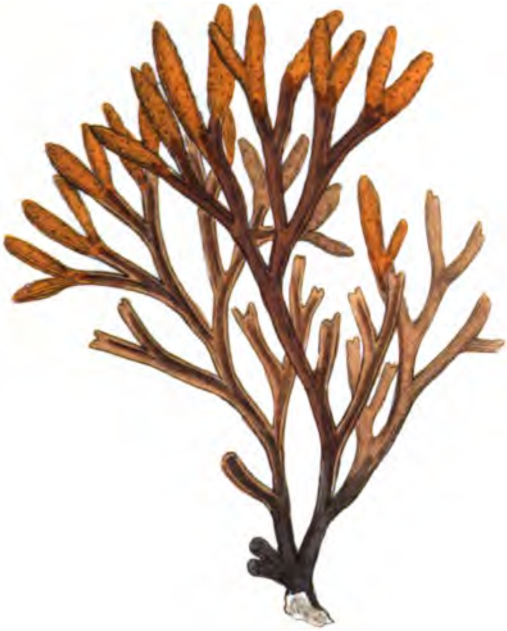
2312.



Fucus canaliculatus.

Publiſhed Jan.y 1 1801 by Ja.s Sowerby London

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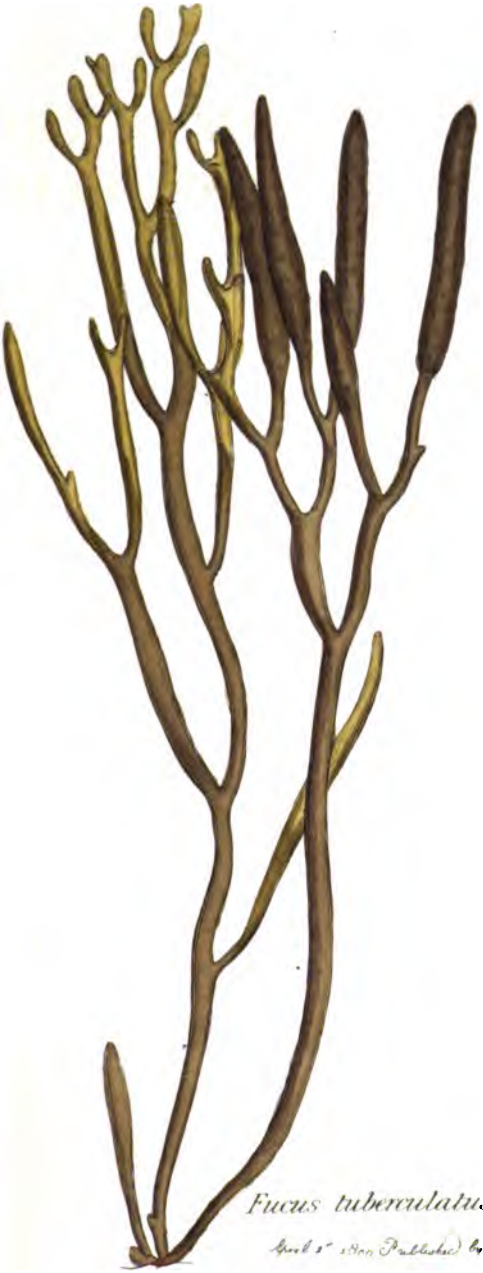
2313.



Fucus tuberculatus.

April 1st 1800 Published by Jas Sowerby.

FUCUS CANALICULATUS. *Channeled Fucus.* TAB. **2312.**

Frond compressed, linear, channeled, dichotomous; destitute of midrib and air-vessels. Receptacles terminal, oblong, (mostly) bipartite.

Fucus canaliculatus, *Linn.* *Turner Hist. Fuc. tab.* 3. *E. B.* 823. *Greville Alg. Brit.* 18. *Hooker Crypt. Part* 1. 268. *Agardh Spec. Alg.* 1. 96.

Frequent on rocks on most parts of the British coast, growing from a little conical disc, and forming tufts from two to six inches in height. Fronds several times dichotomous, very distinctly channeled, entire at the margin; the barren terminations notched. Receptacles oblong, turgid, compressed, wider than the frond, and of a paler and yellower hue, especially when ripe. Fructification in the summer and autumn.

The situation of this species seems peculiarly between high and low water mark, and I have met with it growing, in a very dwarf state, in places where it could only be washed by the sea in stormy weather or during high spring-tides.

"Cattle are exceedingly fond of this plant, and never fail to browse on it in winter, as soon as the tide leaves it within their reach. At this season it is peculiarly wholesome, as counteracting the costiveness induced by their ordinary straw-commons."—*Carmichael in Hooker.*

*** *Frond cylindrical, erect. Receptacles terminal.*

FUCUS TUBERCULATUS. *Tuberculated Fucus.* TAB. **2313.**

Frond erect, cylindrical, dichotomous, without air-vessels. Receptacles terminal, cylindrical.

Fucus tuberculatus, *Hudson.* *Turner Hist. Fuc. tab.* 7. *E. B.* 726. *Greville Alg. Brit.* 18. *Hooker Crypt. Part* 1. 269. *Agardh Spec. Alg.* 1. 98. F. bifurcatus, *Withering* 4. 209. *tab.* 17. *fig.* 1.

A native of the rocky coasts of Cornwall and other places in the south-west of England, but very rare and only a casual visitant elsewhere. Frond six inches to a foot in height, about the thickness of a small quill, cylindrical; fixed to the rocks by a small dilated base, from which proceed generally a few creeping processes: repeatedly dichotomous in the upper part, the axils rounded. Receptacles about twice as thick as the branches which they terminate, and from an inch to an inch and a half long, cylindrical, obtuse. Fructification in the latter end of the summer and autumn.

This is generally of a pale dull olive-green when growing, but becomes black in drying and very brittle. It certainly differs from the rest of our *Fuci* in texture and habit; and were it not for the fructification, which, however, I have not had an opportunity of examining in a recent state, I should suspect an affinity between it and *Furcellaria fastigiata*. Dr. Greville seems to refer it very doubtfully to the genus *Fucus.*

GENUS DCIX. HIMANTHALIA. *Himanthalia. Sea-Thong.*

GEN. CHAR. *Frond* coriaceous, orbicular, peziziform. *Air-vessels* none. *Receptacles* frond-like, elongated, ligulate, compressed, dichotomous, springing from the centre of the frond; containing immersed tubercles furnished with a pore.

The solitary species on which this genus is established, according to the view entertained of its structure by most algologists of the present time, is one of the most remarkable and truly isolated of the whole order; the part previously regarded as the frond being truly an elongated receptacle, and dropping off annually after the emission of the sporules: the divisions of this part being compressed and strap-shaped gave rise to the generic name, bestowed by Lyngbye, from *ἱμὰς, -άντος, a thong* or *strap,* and ἅλς, *the sea.*

Except in the comparatively enormous development of the receptacle, the fructification is not unlike that of *Fucus*; but the curious fungus-like frond has no parallel either in that or any allied genus.

HIMANTHALIA LOREA. *Strap-shaped Himanthalia.* TAB. **2314**.

Frond subpyriform, eventually collapsing, plano-concave, stalked. Receptacles repeatedly dichotomous, linear, slightly tapering at the extremity.

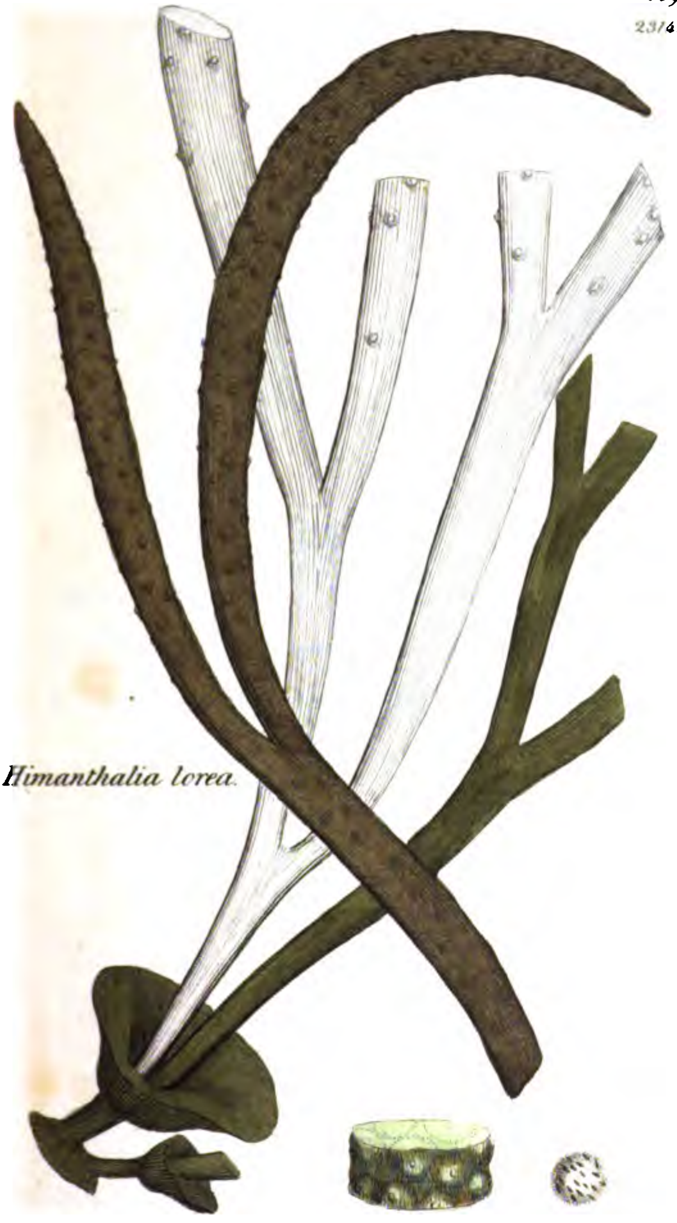
Fucus loreus, *Linn. Turner Hist. Fuc. tab.* 196. *E. B.* 569. *Agardh Spec. Alg.* 1. 98. Himanthalia lorea, *Lyngbye Hydroph. Dan.* 36. *tab.* 8. *Greville Alg. Brit.* 20. *tab.* 3. *Hooker Crypt. Part* 1. 269.

Frequent on rocky sea-shores, and abundant in many places. Fronds clustered, when young pyriform or subglobose, eventually collapsing and becoming plano-concave above, or somewhat cup-shaped, resembling a species of *Peziza*, about an inch high and from one to two inches across; developing from the interior one or several compressed receptacles, seldom much more than a quarter of an inch wide, but from two to ten, or sometimes, it is said, twenty feet in length, repeatedly dichotomous, bearing tubercles throughout, each with a pore at the apex, through which the sporules are discharged together with the containing mucus. Fructification in the winter and spring.

Dr. Greville notes this as an annual plant in his 'Alg. Brit.,' but the frond itself is undoubtedly perennial, as remarked by that ardent investigator of the habits of marine Algæ, the late Captain Carmichael; a fact which, as well as the following, is corroborated by my own observation. "The receptacles of the first year issue from its centre, but every part of the disc is equally capable of producing them, and it will be found accordingly, that in old plants they are always more or less eccentric."—*Carmichael in Hooker.*

509

2314.



Himanthalia lorea.

March 1. 1811. Publish'd by J. Sowerby London.

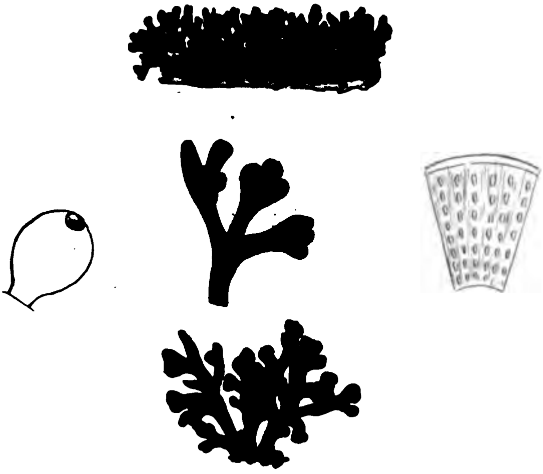
1832
2315

NOTICE.

Mrs. Sowerby begs to inform the Subscribers, that in consequence of alterations necessary to be made in Tabs. 2315 and 2316, they will not be published until a future Number.

1332

2315.



Lychnia pygmæa?

Jul. 1 1804 Published by Jas. Sowerby, London.

The ripe receptacles contain a larger proportion of iodine than *Fucus vesiculosus*, a remark limited, however, to those collected on our southern coasts. Dr. Greville states, that in Orkney, where the plant is plentiful, it is made into excellent kelp.

TRIBE II. LICHINEÆ.

Perennial marine plants, of a blackish-green colour, changing to deep black on exposure to the air, of a cartilaginous substance and fibrous structure. Frond flat or cylindrical, minute, branched in a dichotomous or subpalmate manner. Fructification terminal or nearly terminal, composed of thecæ furnished with a pore, and filled with a colourless gelatinous mass of very fine filaments, among which pellucid, oval or oblong sporules are disposed in many radiating moniliform series.

GENUS DCX. LICHINA. *Lichina.*

GEN. CHAR. *Frond* cartilaginous, blackish-green, dichotomous. *Fructification*: roundish thecæ of the same colour as the frond, containing radiating moniliform lines of pellucid sporules imbedded in a gelatinous mass of filaments.

A genus remarkable as forming apparently a connecting link between the Algæ and Lichens, to the latter of which one of the two species composing it was referred by Sir J. E. Smith in the first edition of the 'English Botany,' an error into which he was led by Acharius; and which rather consisted in the separation of two plants so closely conforming in structure, than in their reference individually to two distinct natural orders, whose limits are only definable by their respective aërial or aquatic habits. The circumstance of one of the species of *Lichina* being positively submarine, while the other grows only within reach of the spray of the sea, and indeed in situations where it is liable to occasional submersion, decides the question, although it must be confessed that in structural affinity the genus is nearer to the Lichens than to the Algæ; hence the generic name.

LICHINA PYGMÆA. *Dwarf Lichina.* TAB. **2315**.

Frond compressed, nearly plane. Thecæ globose.
Fucus pygmæus, *Lightfoot Fl. Scot.* 964. *tab.* 32. *E. B.* 1332.

Turner Hist. Fuc. tab. 204, *fig. a—h.* Lichina pygmæa, *Agardh Sp. Alg.* 1. 105. *Greville Alg. Brit.* 22. *tab.* 6. *Hooker Crypt. Part* I. 270. Fucus pusillus, *Hudson.* F. lichenoides, *Goodenough and Woodward in Linn. Trans.* 3. 192.

Frequent on marine rocks, between high and low water mark, especially on the south-west and western coasts of England. Fronds densely tufted, forming large dark-coloured patches visible at a distance, and often covering the rocks to a considerable extent. They are fixed by a small disc, about half an inch in height, more or less spreading, repeatedly dichotomous, compressed below, dilated, flat, and somewhat palmate upwards, with blunt extremities. Thecæ subglobose, nearly terminal, often clustered, having a small perforation at the summit, which gradually enlarges as the sporules are discharged, until they become like the concave shields of a lichen.

The fructification, produced towards the end of summer, is of very different structure to that of any other known genus of Algæ: the interior of the theca is entirely filled with a mass of fine gelatinous filaments interspersed with radiating lines of oval-oblong, pellucid sporules.

LICHINA CONFINIS. *Lesser Lichina.* TAB. 2316.

Frond cylindrical. Thecæ ovate, terminal.

Lichen confinis, *Acharius Prod. E.B.* 2575. Lichina confinis, *Agardh Sp. Alg.* 1.105. *Greville Alg. Brit.* 23. *tab.* 6. *Hooker Crypt. Part* I. 271. Fucus pygmæus, β. minor, *Turner Hist. Fuc. tab.* 204. *fig. i—o.* Stereocaulon confine, *Ach. Meth.*

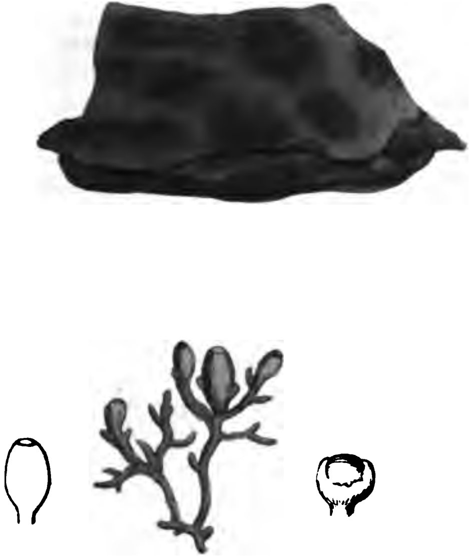
Less frequent than *L. pygmæa*, but found in several places in Scotland, and on the western coast of England and Wales, likewise at Bantry Bay, Ireland; always growing on rocks sufficiently near the sea to be occasionally wetted by its spray, and more generally on such as are partially covered at high tides. Fronds scarcely ever a quarter of an inch in height, densely tufted, spreading concentrically as they die away in the middle, like those of a lichen; they are nearly cylindrical, very irregularly branched, with obtuse extremities. Thecæ always terminal and oval, but in other respects, both as to structure and contents, resembling those of *L. pygmæa*, and like them making their appearance about the middle of the summer and ripening in the autumn.

"My own observations have led me to consider this as a mere variety of the preceding, whose different appearance is due to a more frequent exposure to a dry atmosphere."—*Hooker.*

On the coast of Caernarvonshire, where I first observed this species in July 1820, the two were growing within a few yards of each other; and not being then aware of the identity of the present one with *Lichen confinis* of 'English Botany,' I was led to regard it merely as a starved specimen of the former, thus accounting for its smaller size, the less exuberant fructification, and difference in the form of the fronds.

2575.

2316.



Lychnia confinis.

Dec. [illegible] published by Jas Sowerby London.

TRIBE III. LAMINARIEÆ.

Marine plants, of an olive-brown or olive-green colour, generally becoming darker on exposure to the air, but not black; varying from coriaceous to membranaceous. Frond with a lobed or fibrous base resembling a root, more or less stipitate, and forming a plane, entire or cleft leaf-like expansion, in a few cases furnished with one or more ribs. Air-vessels none, except in the exotic genus *Macrocystis*, unless the hollow stem of some species be considered as such. Fructification, so far as at present known, either sporules mingled with a mass of vertical jointed filaments, or roundish granules without filaments; forming in both cases dense spreading spots or sori on the surface of some part of the frond. Structure densely fibroso-cellular, without any appearance of reticulation.

A very natural family, whether considered with respect to the character of the fructification or the structure of the frond; the first, as observed by Dr. Greville, "is never tubercular, nor are the sporules ever surrounded by a pellucid border or limbus," while the texture of the frond, as viewed under a high magnifying power, is very different from that of the *Fucoideæ*, and it generally is little altered in colour by drying. The base likewise of these plants is peculiar, never forming a disc or scutum, but branching out in a radiate manner into several root-like processes, by means of which they cling so powerfully to the rocks and pebbles, that the larger species are scarcely separable by any ordinary effort of the collector.

To the *Laminarieæ* belong the largest and longest plants of the order: many species of the typical genus found in our seas are of comparatively large growth, but are mere pygmies to those of certain exotic genera met with in warmer latitudes; such is the *Lessonia fuscescens*, described by M. Bory de St. Vincent as growing to the height of twenty-five or thirty feet, with a trunk or stipes often as thick as a man's thigh, which divides into numerous branches, each terminating in a long lanceolate leaf like those of some palms; while the slender, cord-like *Macrocystis pyrifera*, so called from the form of the air-vessels at the bases of its long narrow leaves, is reported to be from 500 to 1500 feet in length, nay sometimes to reach the surface from unfathomable depths.

Many of the species are eaten by man, and some of them seem to partake largely of the nutritive qualities belonging to the order; such is the *Durvillæa utilis*, which is said to constitute a very important article of subsistence to the poor on the western coast of South America.

Genus DCXI. ALARIA. *Alaria*.

Gen. Char. *Frond* membranaceous, leaf-like, furnished with a percurrent, cartilaginous midrib: the stipes pinnated with distinct leaflets. Fructification: pyriform sporules vertically arranged in the incrassated leaflets.

The genus, named from the Latin *ala*, a wing, was established by Dr. Greville, who separated the species according with the above character from the exotic genus *Agarum* of Bory de St. Vincent: he remarks, " they are peculiar in the distichous fertile leaflets of the stem, in the membranaceous substance of the frond, which moreover differs in structure from other *Laminarieæ*: it is easily lacerated, and the lacerations take place in an oblique direction from the margin to the midrib: the surface is scattered over with minute pores, from which issue tufts of minute filaments."

ALARIA esculenta. *Esculent Alaria.* Tab. 2317.

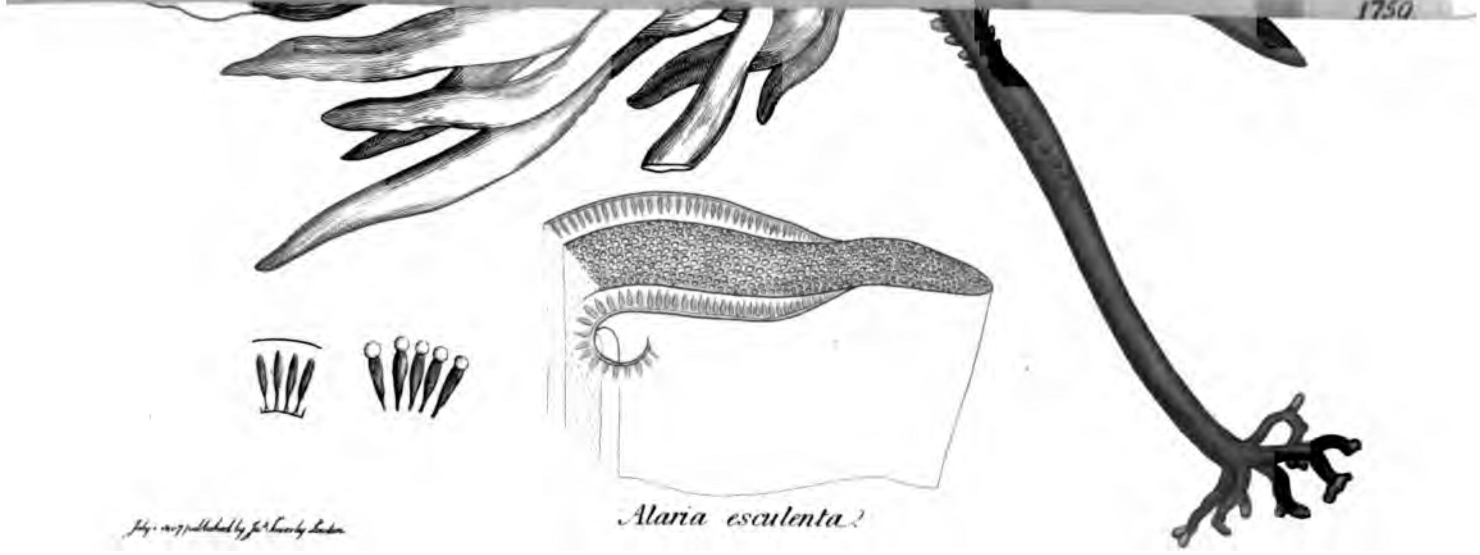
Frond linear-ensiform, entire at the margin: pinnæ linear-oblong, fleshy.

Fucus esculentus, *Linn.* *Turner Hist. Fuc. tab.* 117. *E. B.* 1759. Alaria esculenta, *Greville Alg. Brit.* 25. *tab.* 4. *Hooker Crypt. Part* I. 271. Laminaria esculenta, *Lyngbye.* *Agardh Spec. Alg.* 1. 110. Agarum esculentum, *Bory.*

Frequent on the shores of Scotland and the north of Ireland, and on those of the west and south-west of England, growing generally in rocky bays and coves and in deep water. Stem four to eight inches long, about the thickness of a small goose-quill, fixed to the rocks by thick, clasping fibres; pinnated midway with numerous linear-oblong leaflets, two to seven inches in length, and continued through the whole length of the frond in the form of a midrib. Frond from two to twenty feet long and from two to eight inches wide, thin, membranaceous, leaf-like, of a pale yellowish-green colour, which alters little by drying, during which process it adheres slightly to paper, and becomes little thicker than gold-beaters'-skin. It is rarely found entire. Fructification spreading over the greater part of the upper leaflets on both sides, in the form of a widely extended swelling, in which the sporules are perpendicularly imbedded, as exhibited in the enlarged section on our Plate. Sporules very numerous, narrow, oblong pear-shaped, pellucid, internally dotted, having at their larger extremity a white transparent globule. Annual, producing its fructification in the winter and early spring.

The midrib, stripped of the membranous part, is eaten in Scotland and Ireland, as well as in Denmark, Iceland, and the Faroe Isles; so are likewise the leaflets; but though pleasant to the taste at first, they are said to leave a disagreeable, tenacious crust of greenish mucus upon the tongue and roof of the mouth.

1750

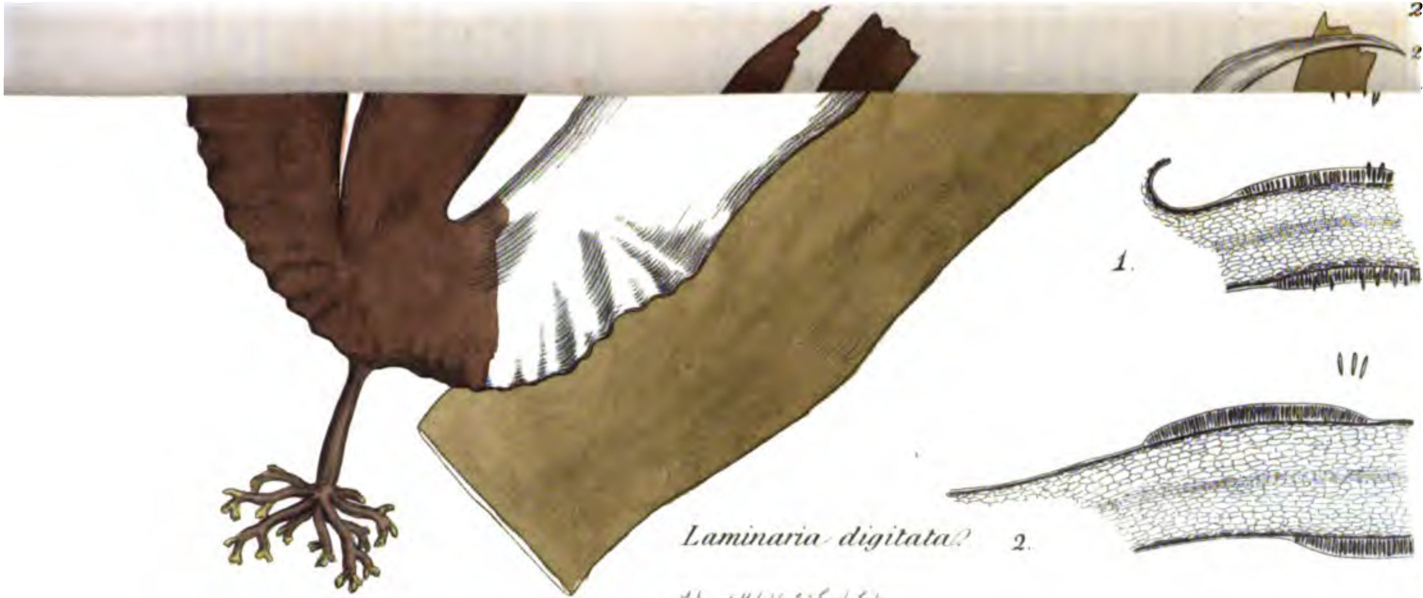


Alaria esculenta.

July 1. 1807 published by Jas. Sowerby London

2274

2318



Laminaria digitata.

[illegible]

In Scotland the plant is known by the name of Badder-locks, in the north of Ireland by that of Murlins. The people of Orkney call it Honey-ware.

GENUS DCXII. LAMINARIA. *Laminaria.*

GEN. CHAR. *Frond* coriaceous (rarely membranaceous), plane, expanded, without a midrib. Fructification: sporules forming dense sori or spots, imbedded in the thickened surface of some part of the frond.

As restricted by the above character, about twenty known species rank under this genus, the fructification of which is very obscure; indeed no traces of it seem to have been discovered except in *L. saccharina*, *L. bulbosa*, *L. digitata*, and the exotic *L. purpurascens*. The species are all marine, and some of them are among the largest of the tribe. *L. buccinalis*, a species found abundantly at the Cape of Good Hope, has a large hollow stem, which the natives convert into a kind of horn or trumpet, hence its name of Trumpet-weed; it contains a larger proportion of iodine than any European Alga. *L. potatorum*, another large species found on the shores of Australia, is used by the natives for making drinking vessels and bowls for carrying water. Our own *L. digitata* and *L. bulbosa* are among the largest of their kind.

The generic name, from the Latin *lamina*, *a thin plate*, is characteristic of the breadth and expanded surface of the frond.

* *Frond cleft into segments.*

LAMINARIA DIGITATA. *Fingered Laminaria. Sea-Hangers. Sea-Girdles.* TAB. **2318.**

Stem woody, cylindrical; expanded at its apex into a roundish, flat, cartilaginous frond, deeply cleft into numerous ensiform, mostly simple segments.

Fucus digitatus, *Linn. Turner Hist. Fuc. tab.* 162. *E. B.* 2274. Laminaria digitata, *Lamouroux. Greville Alg. Brit.* 27. *Hooker Crypt. Part* I. 271. *Agardh Spec. Alg.* I. 112.

Very common on all our rocky shores, generally in deep water, whence it is in stormy weather often cast up in great abundance. Stem from one to six feet in length, and sometimes an inch and a half to two inches in diameter, solid, tough, in old plants almost woody. Frond when young simple, elliptical, entire, eventually cloven in a palmate manner, from one to six feet in length, with a breadth of about one-third, of an olive-brown or greenish hue, and leathery consistence. The fructification, first observed by Mr. Borrer, is represented in the enlarged sectional view of the frond, fig. 1. on our

Plate, fig. 2. being that of *L. saccharina*; the sections made in each instance through sori on both sides of the frond. The sporules resemble somewhat in figure and disposition those of the genus *Alaria*, but they are not terminated above like them by a transparent globular vesicle.

Perennial. The fronds sometimes viviparous.

In a young state the stems of this species are eaten in Scotland, where it goes by the name of *Tangle*, and in some parts of the North it is boiled for the purpose of feeding cattle. Mr. Neill states that the stems in Scotland are sometimes made into knife-handles; for this purpose "a pretty thick stem is selected and cut into pieces about four inches long: into these, while fresh, are stuck blades of knives, such as gardeners use for pruning and grafting. As the stem dries it contracts and hardens, closely and firmly embracing the hilt of the blade. In the course of some months the handles become quite firm, and very hard and shrivelled, so that when tipped with metal they are hardly to be distinguished from harts-horn."

On many parts of our coast *L. digitata* forms the largest proportion of the sea-weed collected for manure; and Johnson, the author of the 'Berwick Flora,' mentions that in some places in the Hebrides it "forms even a sort of soil on the pebbles of the beach, on which the poor natives sow barley; and as the sea-weed rots, the grain drops with it into the interstices, so that when the harvest is ready it is seen growing on a surface of naked polished pebbles."

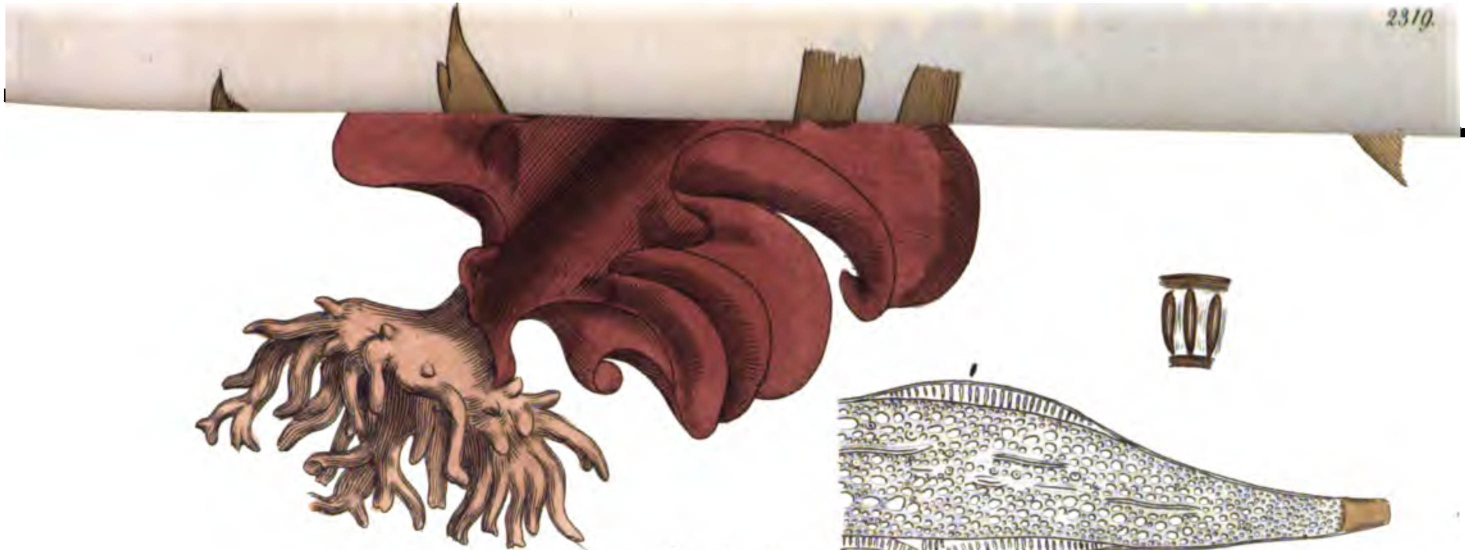
LAMINARIA BULBOSA. *Bulbous Laminaria.* *Sea-Furbelows.* TAB. 2319.

Stem plane, with a waved foliaceous margin, once twisted at the lower part; arising from a large, rough, hollow, bulb-like base, set with short thick fibres. Frond roundish or reniform, deeply cleft into numerous ensiform segments.

Fucus bulbosus, *Hudson. Turner Hist. Fuc. tab.* 161. *E. B.* 1760. Laminaria bulbosa, *Lamouroux. Greville Alg. Brit.* 29. *Hooker Crypt. Part* 1. 271. *Agardh Spec. Alg.* 1. 114. Fucus polyschides, *Lightfoot. Stackhouse.*

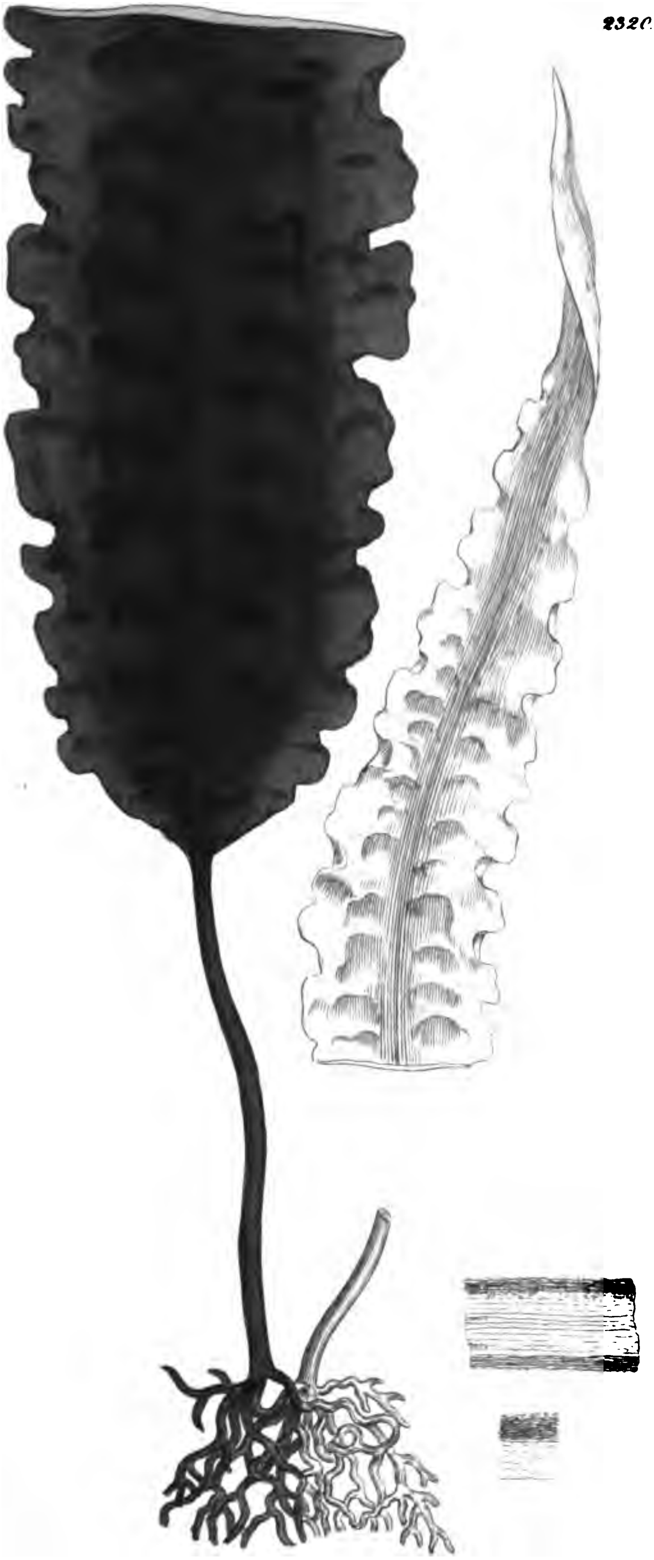
Not unfrequent on the southern and western shores of England, and on those of Scotland and Ireland, but only in deep water. The largest of our sea-weeds, a single plant being sometimes as much as a man can carry. Mrs. Griffiths measured one at Torquay which, when spread out upon the ground, formed a circle of at least twelve feet in diameter. Base fibrous, with a knob or dilatation above, which eventually swells into a large, roundish, hollow, bulb-like process, several inches in diameter in the full-grown plant, rough all over with short thick fibres and papillary projections, and completely investing the original point of attachment. Stems from one to three, but mostly solitary, flat, two to four inches or more in breadth, remarkably bordered on each side at the lower part, with a folded, undulated expansion, and dilating suddenly at the summit into a large rounded or reniform frond, deeply divided in a digitate manner into numerous linear-oblong or ensiform segments. Frond smooth, even

2319.



Laminaria bulbosa.

July 1. 1807 published by Jas. Sowerby London.



Laminaria saccharina

so as to appear varnished, olive-brown or greenish, except about the stem and its furbelows, which are reddish, especially when in fructification. The latter forms prominent patches on each side of these curious expansions, and sometimes extending even along the upper part of the stem; the narrow elliptical sporules being arranged vertically beneath the cuticle, as exhibited in the transverse section. Perennial.

In the young state the frond is simple, the stem filiform without the undulated margins, and the curious bulb-like base merely represented by a slight swelling of the part on which it eventually forms. The use of the latter remarkable appendage, with its copious development of short, thick, clasping fibres, is to counterbalance the force of the water in rough weather, acting upon the enormously dilated frond, and enable the plant to maintain its hold on the rock.

** *Frond undivided.*

LAMINARIA SACCHARINA. *Sweet Laminaria. Sea-Belt.* TAB. **2320.**

Stem cylindrical, compressed upwards, expanding at its apex into a cartilagino-membranous, flat, linear-oblong, attenuated frond.

Fucus saccharinus, *Linn. Turner Hist. Fuc. tab.* 163. *E. B.* 1376. Laminaria saccharina, *Lamouroux. Greville Alg. Brit.* 32. *Hooker Crypt. Part* 1. 272. *Agardh Spec. Alg.* 1. 117.

Abundant on all our rocky shores, adhering to stones and other substances by its perennial*, somewhat creeping cluster of intricately branched, rigid fibres. Stems from an inch to several feet in length; expanding at the apex into a more or less lanceolate or linear-oblong frond from one to ten or twelve feet long and two to sixteen inches broad, rounded at the base, of a dark olive-green generally, but often paler, or with a yellowish or reddish tinge, and varying in substance from cartilaginous almost to membranaceous, with an entire or sometimes sinuated margin, plane or rugose. Fructification very obscure, but probably contained in more or less distinct, irregular sori, occasionally found in the middle part of the frond, and including minute oblong granules intermingled with filaments.

β. bullata. Frond bullate in the centre, the margins waved. With this variety our figure must be identified.

γ. latifolia. Stem short, cylindrical, expanding into an ovato-elliptical, submembranaceous, undivided frond. L. latifolia, *Agardh Spec. Alg.* 1. 119. *Greville Alg. Brit.* 31. Fucus saccharinus, var. latissimus, *Turner.* Ulva maxima, *Gunner Fl. Norv.* 2. *tab.* 7. *fig.* 5.

The specific name *saccharina* was bestowed from the circumstance of the frond, after being washed in fresh water and hung up to dry, especially when exposed to the sun, being covered with a white efflorescence of a sweetish flavour, but certainly not at all resembling that of sugar, as the name would indicate; it consists indeed chiefly of salt, and is far from agreeable. The plant is eaten in some countries after boiling, but seems not to be a favourite article of food. Thunberg states, in his 'Flora Japonica,' that, however coriaceous in substance, it is so prepared by the Japanese as to be rendered entirely esculent; and further remarks a custom prevalent among them, when presents are made, of accompanying them with a portion of the frond attached to a piece of paper curiously folded, and tied with threads of gold and silver. The species is common in their seas.

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* I am satisfied by long observation that the fibrous base of this plant is perennial, and sends up from season to season new fronds, which seem not however to develope their fructification until the second year.

LAMINARIA Phyllitis. *Hart's-tongue Laminaria. Thin-leaved Laminaria.* Tab. **2321**.

Stem short, cylindrical, compressed; expanding above into a very thin, membranaceous, lanceolate or linear-lanceolate frond.

Fucus Phyllitis, *Stackhouse Ner. Brit. tab.* 9. *Turner Hist. Fuc. tab.* 164. *E. B.* 1331. Laminaria Phyllitis, *Lamouroux. Agardh Spec. Alg.* 1. 121. *Greville Alg. Brit.* 34. *Hooker Crypt. Part* 1. 272. L. saccharina, var. attenuata, *Greville Fl. Edin.* 282.

Found growing upon the stems of the larger species of marine Algæ, rarely on stones, in the sea, on several parts of the coast of England, especially on the southern, also on those of Scotland and Ireland. Frond from a few inches to three feet long, linear-lanceolate, tapering to each extremity, and passing below into a short, partly cylindrical stem, attached to the supporting substance by clasping fibres, resembling those of the rest of the *Laminariæ*. The pale colour, extremely thin, almost transparent, membranaceous texture of the frond, and its tapering base, form the chief distinguishing characters of the species, which in old and large specimens certainly approaches near to *L. saccharina*. No fructification has yet been observed, a circumstance in favour of its being a variety only.

Our figure represents the young state of the plant, when it is of a pale yellowish-green colour and adheres to paper in drying, which is not the case with young specimens of the true *L. saccharina*.

Said to be biennial, but undoubtedly, in some situations, several years before it attains its ultimate growth.

LAMINARIA debilis. *Delicate Laminaria.*

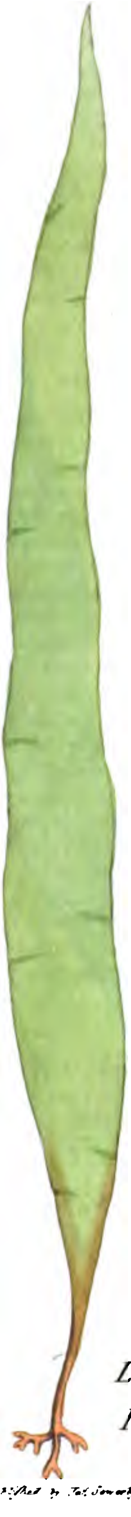
Stem very short, setaceous; expanding into a broadly oblong, membranaceous frond with a cuneate base.

Laminaria debilis, *Agardh Spec. Alg.* 1. 120. *Greville Alg. Brit.* 35. *tab.* 5. *Crypt. Fl. tab.* 277. *Hooker Crypt. Part* 1. 272. L. papyrina, *Bory*.

Found by Mr. J. Chalmers on the coast of Islay, one of the western islands of Scotland. Fronds tufted, springing from a minute, almost scutate base, two to ten inches in height and one to three inches in width, obtuse, obovate or wedge-shaped, occasionally somewhat linear; always suddenly attenuated below into a short, almost obsolete stem; thin, semitransparent, subflaccid, pale olive-green. When young it adheres to paper in drying.

1331

2321.



Laminaria

Phyllitis.

July 1. 1804. Publish'd by Jas. Sowerby, London.

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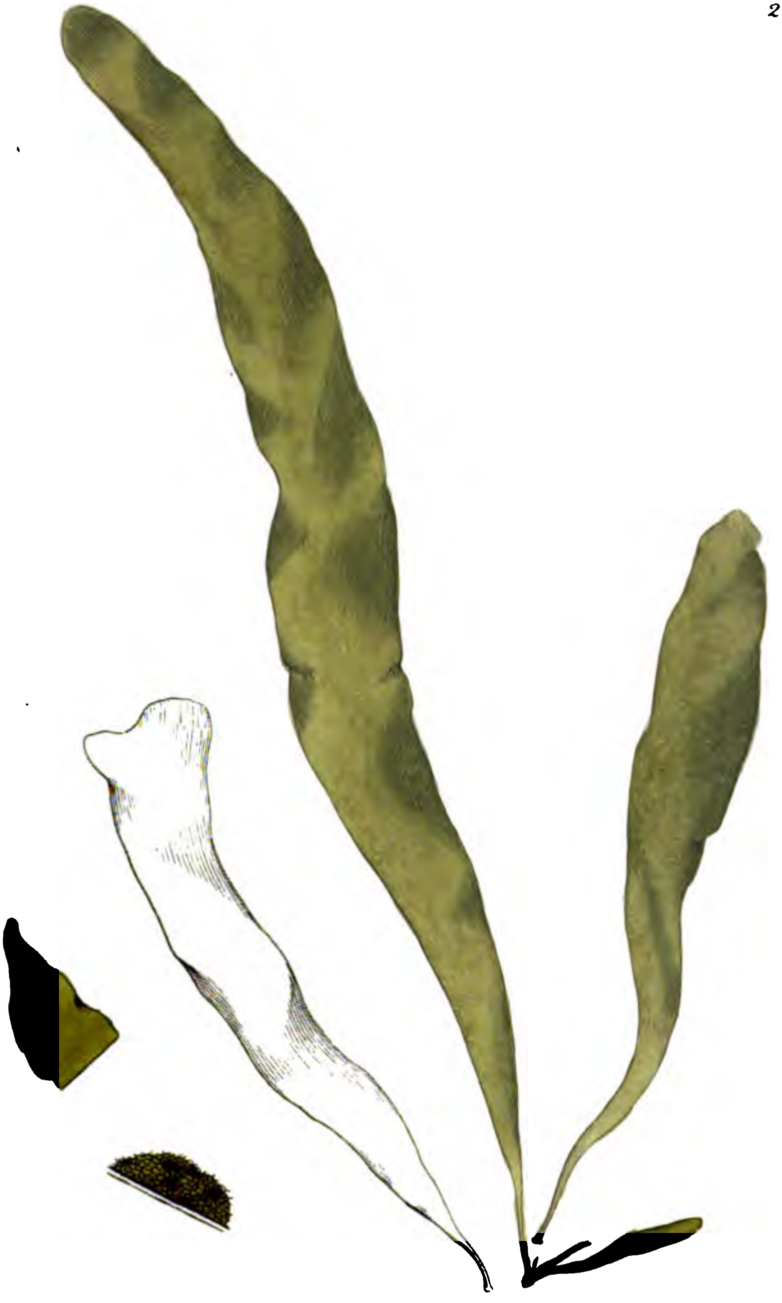


Laminaria fascia

Octr 1st 1840.

I only know this from description and the figures above quoted. Is it distinct from the following?

LAMINARIA **FASCIA**. *Fillet-like Laminaria.* TAB. 2322.

Frond submembranaceous, linear, undulated, much attenuated at the base.

Laminaria fascia, *Agardh Spec. Alg.* 1. 122. L. fascia, γ. latior, *E. B. Supp.* 3. 2845. Fucus fascia, *Œder Fl. Dan. tab.* 768. *Turner. Roth.*

Occasionally met with on the coast of Cornwall and Devonshire, as about Penzance, Sidmouth, and Torbay. Fronds tufted, springing from a minute scutate base; from five to seven inches long, thin, membranaceous, linear-lanceolate, very much attenuated below, obtuse above, and sometimes slightly dilated and emarginate, as if from a tendency to become dichotomous; green when young, afterwards acquiring a brownish tint; slightly undulated on the margin.

The structure of this plant is obscurely cellular: there is no trace of fructification, unless the spotted appearance in one of our figures be an indication of it; and in its absence the correctness of the reference to *Laminaria* may be doubted, as well in this case as in that of the preceding species, especially as the basal fibres, so strikingly characteristic of the genus, are wanting in both.

TRIBE IV. SPOROCHNOIDEÆ.

Marine plants of an olivaceous or yellowish-green colour, not changing to black in drying; of a cartilagino-membranaceous substance, becoming flaccid almost immediately after exposure to the air, in some cases acquiring under such circumstances a verdigris-green colour, and then possessing the property of rapidly decomposing other delicate Algæ in contact with them. Frond with a scutate (rarely tomentose) base; flat, compressed or cylindrical, with distichous (rarely irregular) branches, and bearing in most species, at some period of their growth, little pencil-like tufts of fine green filaments. Fructification, as far as it is known, composed of club-shaped, moniliform, radiating filaments, either forming sessile warts, or arranged concentrically in little, stalked, club-shaped bodies, terminated by pencils of delicate fibres.

The three genera referred by Dr. Greville to this tribe have little or no natural affinity.

GENUS DCXIII. DESMARESTIA. *Desmarestia.*

GEN. CHAR. *Frond* cartilaginous, plane or compressed, distichously branched; while young furnished with marginal, deciduous tufts of fine green filaments; the branches set with marginal spines. Fructification unknown.

In habit this differs greatly from the other genera of the tribe, and no signs of fructification have yet been observed. Named in honour of A. G. Desmarest, a celebrated French naturalist.

DESMARESTIA LIGULATA. *Ligulate Desmarestia.* TAB. 2323.

Frond plane, submembranaceous, with an obscure midrib, tri- or quadri-pinnate; pinnæ and pinnulæ opposite, linear-lanceolate, attenuated at the base.

Fucus ligulatus, *Lightfoot Fl. Scot.* 946. *tab.* 29. *Turner Hist. Fuc. tab.* 98. *E. B.* 1636. Desmarestia ligulata, *Lamouroux. Greville Alg. Brit.* 37. *tab.* 5. *Hooker Crypt. Part* 1. 273. Sporochnus ligulatus, *Agardh Spec. Alg.* 1. 158. *Greville Fl. Edin.* 287. Desmia ligulata, *Lyngbye Hydroph. Dan.* 33. *tab.* 7.

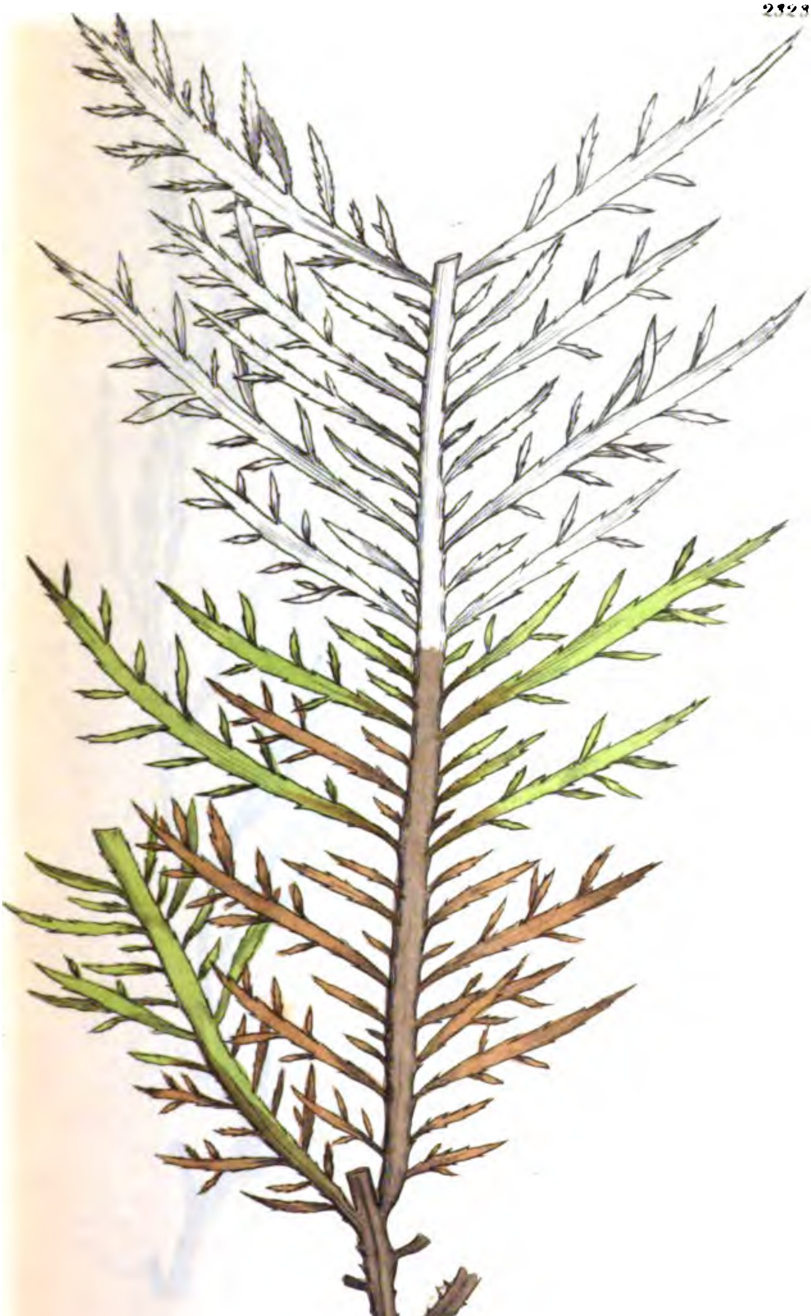
Not uncommon on the southern coast of England, but always growing in deep water and below the ebb, whence it is occasionally cast up in stormy weather; less frequent elsewhere, but collected as far north as the Orkney islands. Frond from two to six feet long, fixed by a small scutate base, flat, except at its very commencement, and when fresh from the water exhibiting a faint midrib, of a delicate pale green colour, changing to olive or greenish-brown in age, or by exposure to the atmosphere; pinnated throughout, and generally three or four times, the pinnæ and pinnulæ all attenuated at the base and apex, and set with little marginal teeth or serratures, almost universally opposite. Small pencil-like tufts of fine filaments, produced in the axils of the teeth or serratures, drop off as the plant approaches maturity. Annual. When young it adheres to paper in drying.

DESMARESTIA ACULEATA. *Prickly Desmarestia.* TAB. 2324.

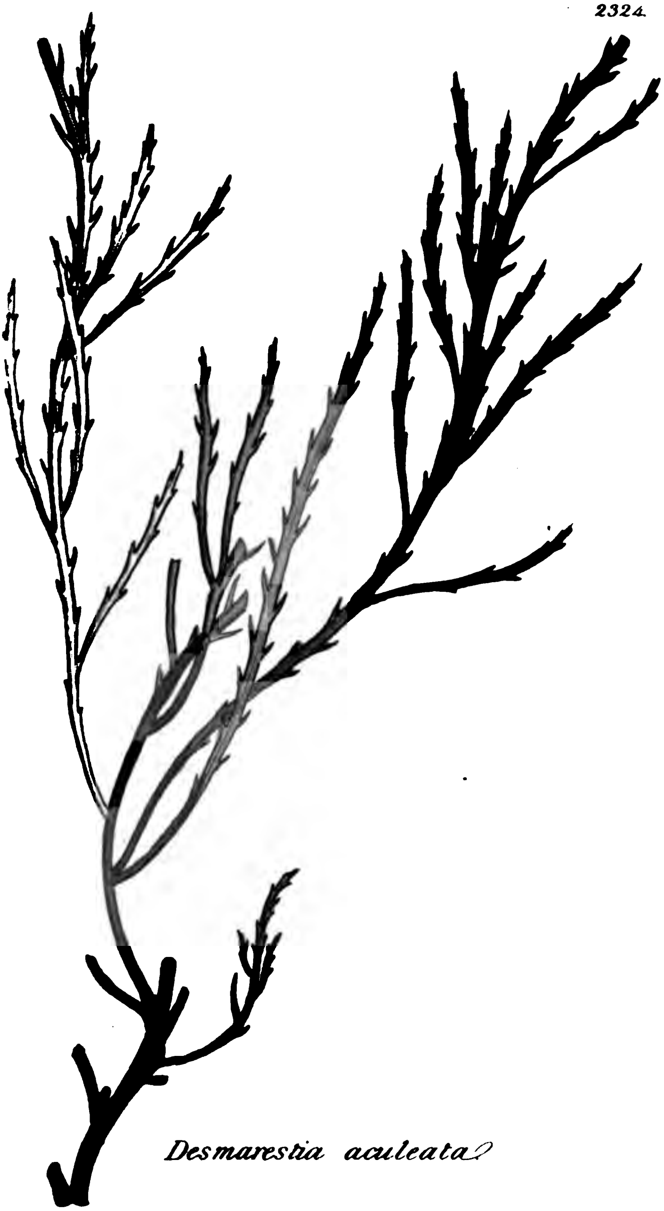
Stem short, cylindrical, extending into a much-branched, linear, filiform, flattish frond, alternately and repeatedly pinnated; branches solitary or in pairs; the pinnulæ set with erect, subulate, distichous spines.

Fucus aculeatus, *Linn. Turner Hist. Fuc. tab.* 187. *E. B.* 2445. Desmarestia aculeata, *Lamouroux. Greville Alg. Brit.* 38. *tab.* 5. *fig.* 2—3. *Hooker Crypt. Part* 1. 273. Sporochnus aculeatus, *Agardh Spec. Alg.* 1. 151. Desmia aculeata, *Lyngbye Hydroph. Dan.* 34. *tab.* 44. *B.* 1.

Frequent on all our shores. Frond from one to three feet long, fixed by a small callous disc; stem cylindrical, almost woody, repeatedly branched in a subdistichous manner, and always alternately; branches linear, very narrow, flat, tapering to the base and summit, fringed at the margin with scattered, subulate spines or teeth, concealed in a young state by pencils of fine, green, conferva-like filaments, which, as in the preceding species, are early deciduous.



Desmarestia ligulata?



Desmarestia aculeata?

[illegible] published by Ja.s Sowerby London

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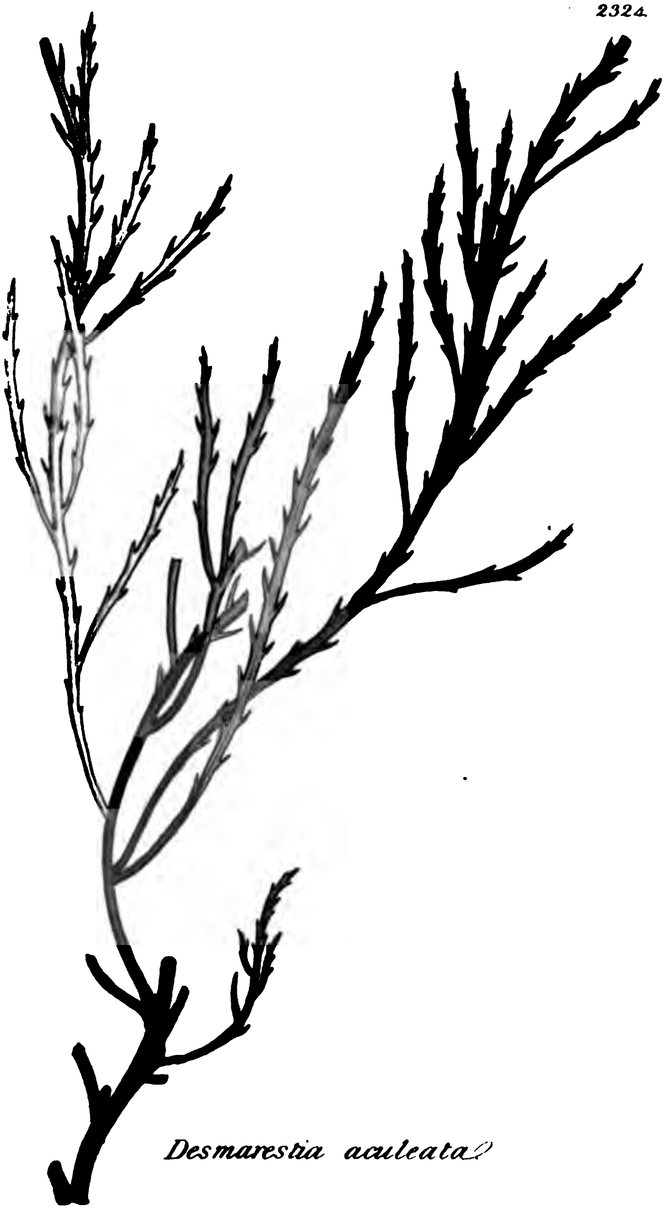
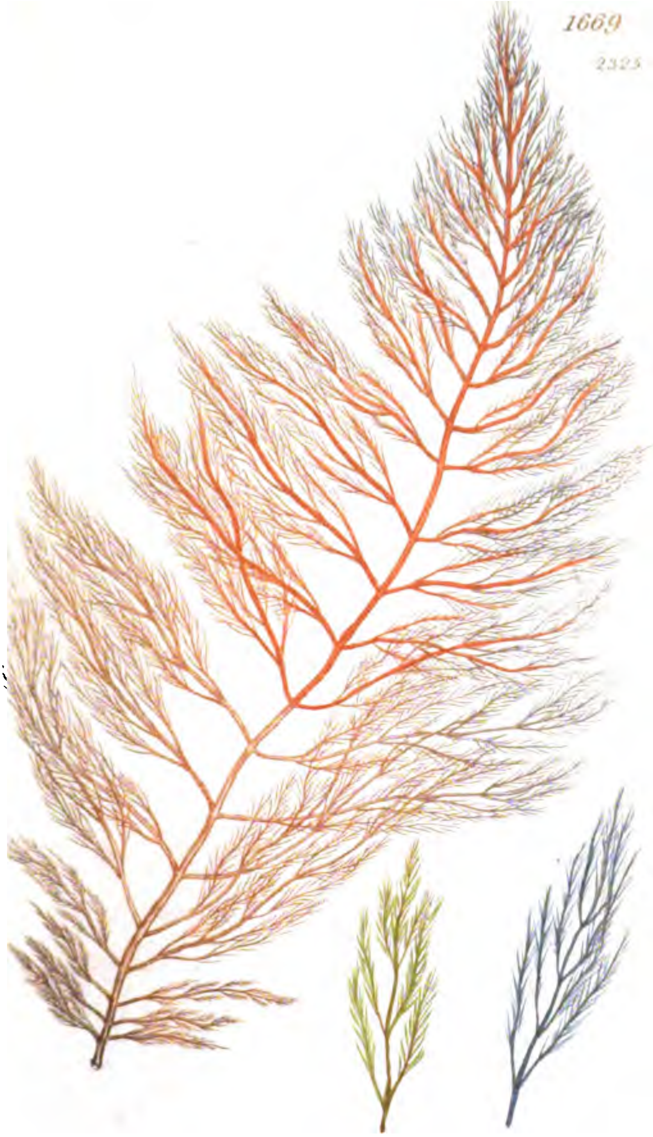


Desmarestia aculeata?

Aug. 1. [illegible] published by Jas. Sowerby London



Dichloria viridis.

Nov. 1. 1806. Publish'd by Jas. Sowerby, London.

Perennial. Olive-green when growing, becoming darker and sometimes brownish by drying: does not adhere to paper.

"If gathered in the young state it soon becomes flaccid, and if allowed to remain in the vasculum, even for a short time, turns to a verdigris-green, and destroys the Algæ placed near it."—*Greville.*

It is difficult to conceive how these plants are propagated, no fructification having been discovered upon them at any season, unless the deciduous tufts of filaments are concerned in the process, which, considering the period of their production, would be contrary to that law, hitherto held as universal in the development of organic being, which makes the reproductive power and the state of maturity coeval.

Genus DCXIV. DICHLORIA. *Dichloria.*

Gen. Char. *Frond* cylindrical, filiform, cartilaginous, pinnated with opposite branches, becoming flaccid and of a verdigris-green colour on exposure to the air. Fructification unknown.

The single species on which this genus is established is judiciously separated by Dr. Greville from *Desmarestia*, to which Lamouroux referred it on account of the very different structure and habit. "The interior," he observes, "is composed of a mass of longitudinal jointed fibres, or, at least, has a cellular tissue, which is so arranged as to separate into fibre-like portions. There are no pencils of filaments, and, unlike all the species of *Desmarestia*, the branches are not attenuated at their origin."

The name, from the Greek δὶς, *twice*, and χλωρὸς, *green*, is indicative of the change from olive- to verdigris-green which the plants undergo when exposed to the air.

DICHLORIA viridis. *Green Dichloria.* **Tab. 2325.**

Fucus viridis, *Fl. Dan. tab.* 886. *Turner Hist..Fuc. tab.* 97. *E. B.* 1669. Dichloria viridis, *Greville Alg. Brit.* 39. *tab.* 6. *Hooker Crypt. Part* I. 274. Desmarestia viridis, *Lamouroux.* Sporochnus viridis, *Agardh Spec. Alg.* I. 154. *Greville Fl. Edin.* Gigartina viridis, *Lyngbye.* Chordaria viridis, *Agardh Syn. Alg. Scand.* 14.

An annual species, not uncommon, growing on stones and epiphytic on the larger Algæ on most parts of our coasts. Frond one to two feet long, fixed by a small callous disc, about the thickness of ordinary packthread at the lower part, gradually attenuated upwards, and beautifully pinnated with opposite branches about a quarter of an inch apart, which are again divided in a similar manner three or four times; all the divisions cylindrical, filiform, attenuated towards the extremity, the ultimate ones very fine, hair-like. Colour olive-green, often changing in age to orange or tawny; becoming of a verdigris green only when exposed to the air in a recent state, or before it is washed in fresh water; in the latter case it generally assumes a brownish hue which it retains in the herbarium. It adheres but slightly to paper.

The total absence of anything resembling fructification renders the generic allotment of this plant very uncertain, as evinced by its several synonyms. Dr. Greville considers it as forming a connecting link between *Desmarestia* and *Sporochnus*, and remarks that it possesses a similar property to *D. aculeata*, in decomposing most other Algæ placed in contact with it, after it has been removed from the water.

A highly elegant species, attaining its full growth in the end of the summer: in general appearance very much like a *Conferva*.

GENUS DCXV. SPOROCHNUS. *Sporochnus.*

GEN. CHAR. *Frond* filiform, cylindrical, or compressed, cartilagino-membranaceous. *Fructification*: club-shaped, moniliform filaments, radiating in scattered warts, or concentrical in distinct (mostly clavate, stalked) receptacles, often terminated by a deciduous tuft of filaments.

In a recent state, viewed under a slight magnifying power, these plants have at first sight a resemblance to zoophytes, the scattered tufts of filaments being not unlike the tentaculæ of some of the polype family, but the resemblance is traceable no farther, and some of them are more likely to be confounded with the *Confervæ* by the superficial observer, as was the case with two of the three British species in the earlier period of algological research, viz. *S. villosus* and *S. rhizodes.* The generic name, bestowed by Agardh, from *σπόρος*, *a seed*, and *χνόος*, *wool*, is expressive of the most striking character of the genus, the little pencils of filaments that either accompany or are identical with the fructification, and give the plants, viewed under water, a woolly appearance. The species are all marine and apparently annual.

SPOROCHNUS PEDUNCULATUS. *Pedunculated Sporochnus.*
TAB. **2326**.

Frond cylindrical, filiform; with slender pinnated, simple branches, set with obovate, stalked receptacles, terminated by a deciduous tuft of articulated filaments.

Fucus pedunculatus, *Hudson. Turner Hist. Fuc. tab.* 188. *E. B.* 545. Sporochnus pedunculatus, *Agardh Spec. Alg.* 1. 149. *Greville Alg. Brit.* 41. *tab.* 6. *Hooker Crypt. Part* 1. 274. Gigartina pedunculata, *Lamouroux.*

Not common, but met with on various parts of the coast of En-

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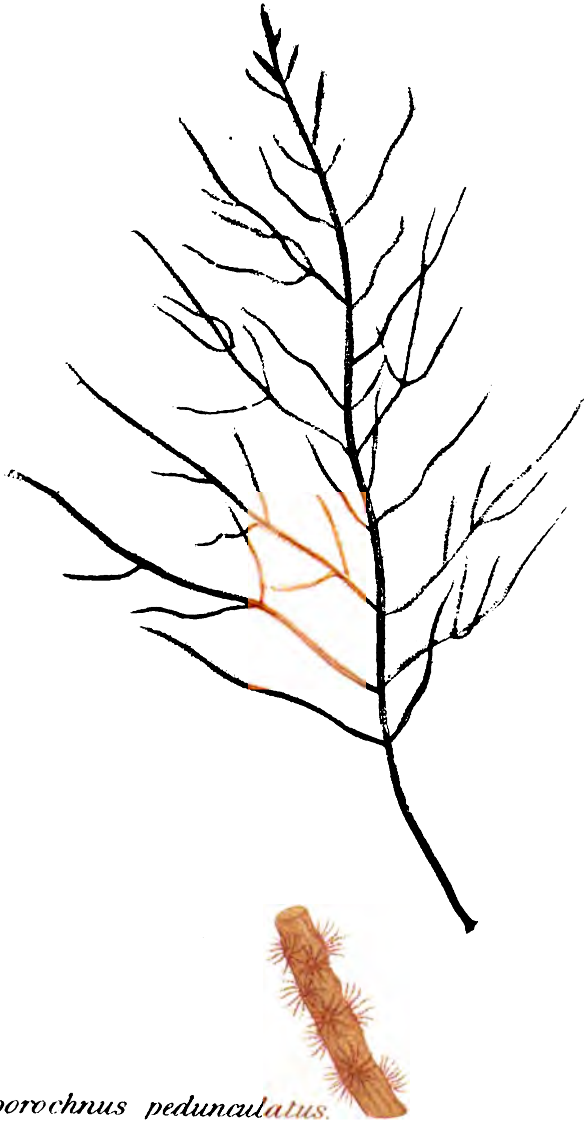

Sporochnus pedunculatus.

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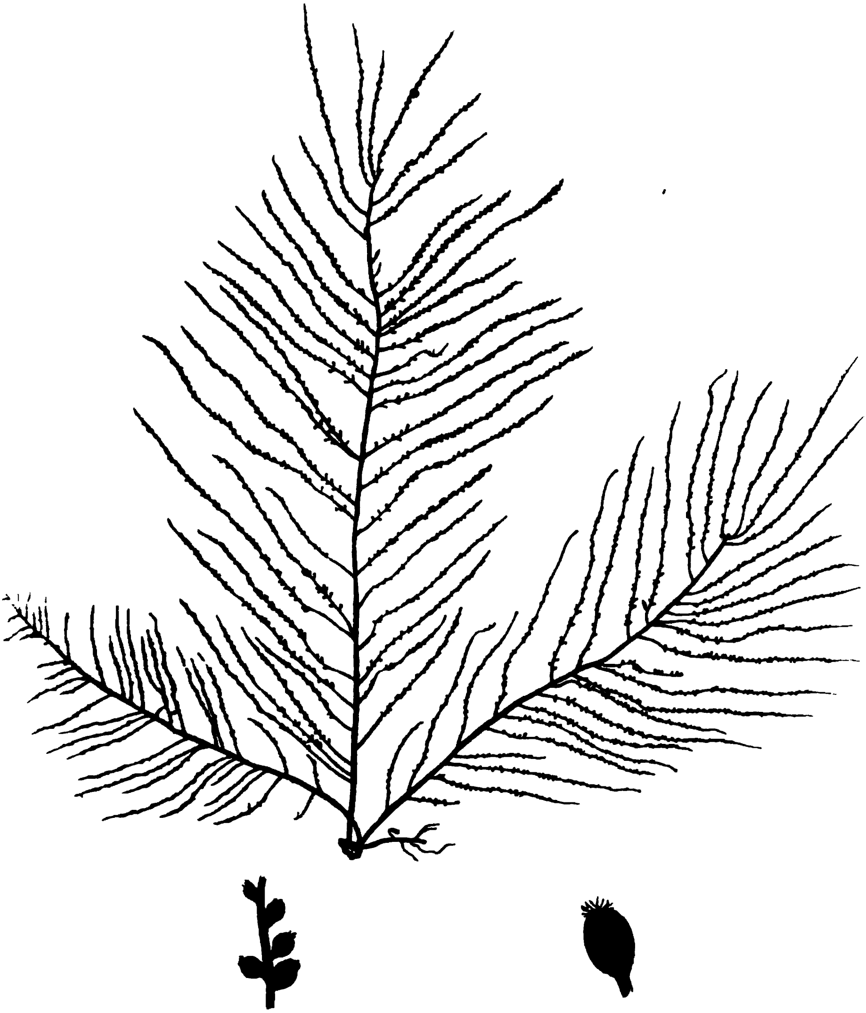

Sporochnus pedunculatus.

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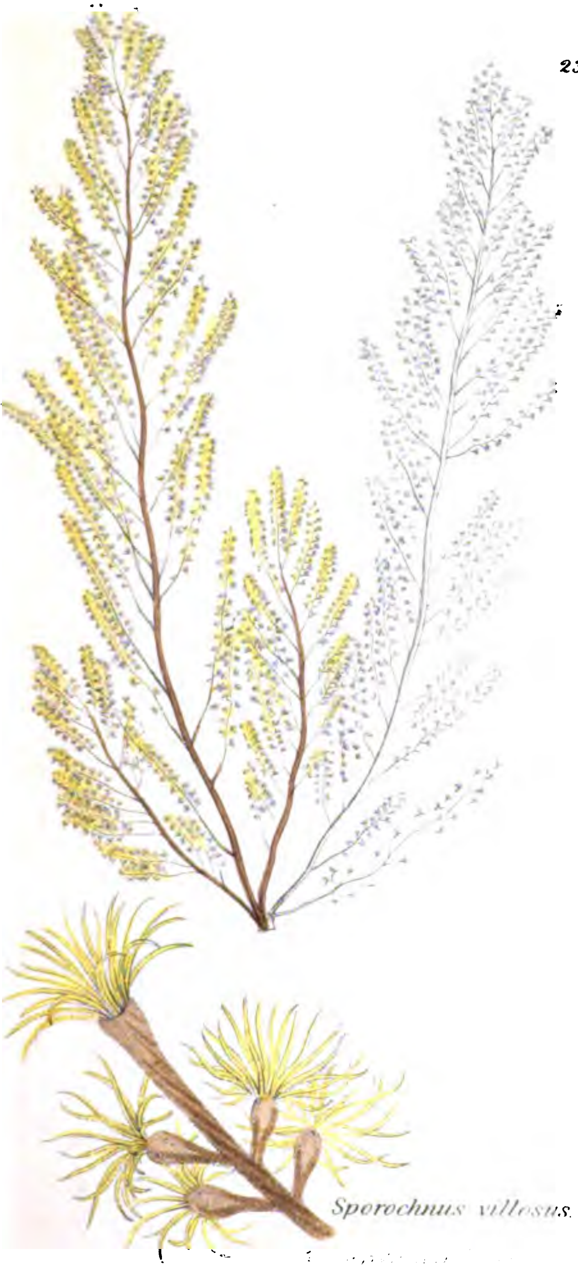

Sporochnus villosus.

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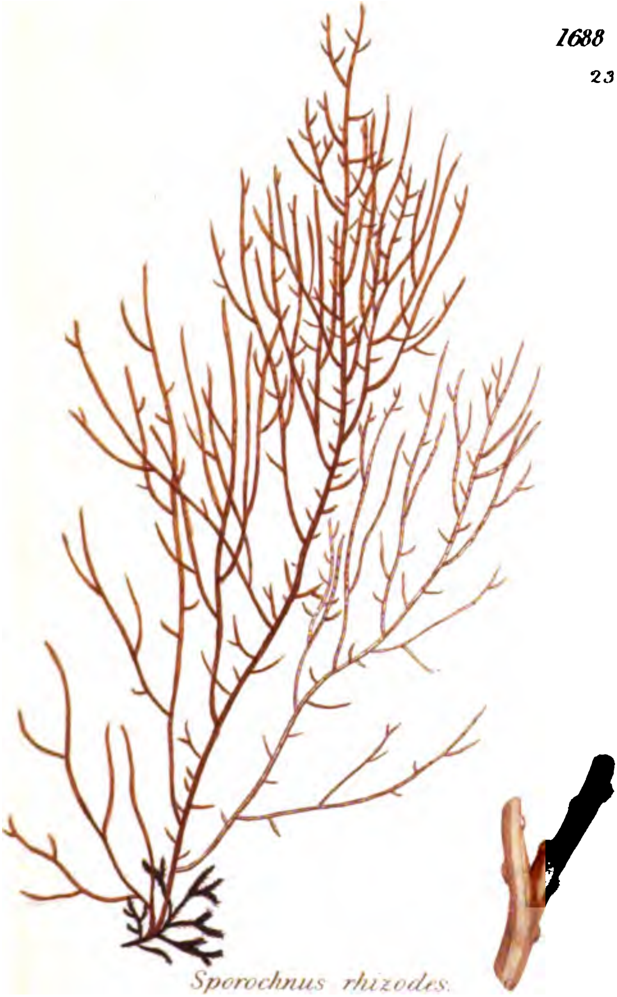

Sporochnus rhizodes.

Jan. 1. 1807 Publish'd by Jas. Sowerby, London.

gland, and at Preston Pans, on the Frith of Forth, Scotland. The slender, thread-shaped fronds, from six to eighteen inches in length, spring either singly or several together from a small roundish disc, and are set with long, straggling, simple branches, somewhat distichously arranged; upon which, as well as upon the stem itself, are disposed on all sides, at short intervals, numerous minute, club-shaped receptacles, tapering into a short stalk below, and terminating above in beautiful yellowish-green pencils of fine, jointed filaments, eventually deciduous. The receptacles, when highly magnified, appear to be short, rudimentary branches, on the exterior of which are disposed in a concentric manner, so closely as to render the surface apparently continuous, innumerable, more or less branched or simple, jointed filaments, whose terminal vesicles are generally larger than the rest, and turgid with a dark-coloured endochrome; they are considered to be the reproductive germs or sporules, but nothing positive is known respecting them.

The colour of the plant is a pale yellowish-brown; its substance almost cartilaginous. Apparently annual; the receptacles attaining maturity about the end of the summer. It adheres to paper in drying.

SPOROCHNUS VILLOSUS. *Hairy Sporochnus.* TAB. **2327.**

Frond cylindrical, filiform, repeatedly pinnated, pinnæ and pinnulæ mostly opposite; stem and branches minutely nodose, with whorls of delicate filaments arising from the nodes.

Conferva villosa, *Hudson. E. B.* 546. Sporochnus villosus, *Agardh Spec. Alg.* 1. 155. *Greville Alg. Brit.* 42. *Hooker Crypt. Part* 1. 274.

Found in the same habitats as the preceding, and generally accompanying it. Fronds generally several together from the same small disc, from a few inches to two or three feet in length, very slender, almost capillary, from once to thrice pinnated with rather remote opposite pinnæ, yellowish- or brownish-green. The abundant and dense whorls of branched filaments, terminating the minute knobs on every part of the branches and their subdivisions, and the extreme tenuity of the latter, render this one of the most beautiful of marine plants. No fructification has been observed, unless the filaments supply the place of sporules.

Mr. Hassell, who gathered it with the preceding species in the Frith of Forth, remarked that "the fresh specimens, when spread on paper, rendered it transparent, as if it had been touched with oil; but in a very short time the transparency quite disappeared."

SPOROCHNUS RHIZODES. *Root-like Sporochnus.* TAB. **2328.**

Frond filiform, irregularly branched; the branches subdichotomous, more or less attenuated, rough, and almost twisted in appearance with the wart-like fructification.

Conferva verrucosa, *E. B.* 1688. Sporochnus rhizodes, *Agardh Spec. Alg.* 1. 156. *Greville Alg. Brit.* 43. *tab.* 6. *Hooker Crypt. Part* 1. 275. Chordaria rhizodes, *Agardh Syn. Lyngbye Hydroph. Dan.*

52. *tab.* 13. *et* C. paradoxa, *ejusd. tab.* 14. Fucus rhizodes, *Turner Hist. Fuc. tab.* 235.

Epiphytic on other Algæ on the southern coasts of England and Ireland. Frond slender-filiform, from three inches to a foot or more in length, pale reddish- or yellowish-brown, irregularly branched, the branches subdichotomous. Fructification; wart-like projections thickly scattered over the whole surface of the frond, rendering it rough, and distorted as if twisted: the warts composed of numerous radiating, articulated filaments, the terminal vesicles of which are generally swollen with a dark endochrome, like those of *S. pedunculatus*. Annual. Apparently maturing about the end of the summer. Adheres to paper in drying.

TRIBE V. CHORDARIEÆ.

Marine plants of an olive-green colour, becoming darker on exposure to the air; of a cartilaginous and lubricous substance. Frond with a scutate base; continuous, cylindrical, filiform, composed of a compact cellular centre, and a dense exterior mass of concentrical filaments. Fructification imperfectly known.

The single genus referred by Dr. Greville to this tribe is too equivocally situated, in regard to structure, to associate elsewhere, and in some respects, as the representative of a separate group, seems to be not altogether out of place here, between the *Sporochnoideæ* and *Dictyoteæ*. Sir W. J. Hooker follows this arrangement, seemingly convinced of its propriety; but observes, that "Mr. Harvey is inclined to place it with the *Batrachospermeæ* in the suborder *Gloiocladeæ*." I am unacquainted with any species of *Chordaria* except *C. flagelliformis*; but, after a very close investigation of its structure, believe Mr. Harvey's view correct: the cellular centre of the frond consists of vesicles arranged longitudinally in moniliform series*, which, though perhaps less obviously, is undoubtedly the condition of the axis in some of the *Batrachospermeæ*; and when we add to this the exterior mass of "*radiating, articulated, subdichotomous filaments*†," and the lubricous character of the species, we can scarcely hesitate to admit that a very close affinity in structure does really exist between plants which, under our adopted system, are placed so widely apart as to occupy almost the extremes of the series before us.

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* I have to regret, that in my too hasty sketch of the microscopic view of the interior of the frond, the vesicles in the longitudinal section have been represented far too short and irregular; their disposition is truly moniliform.

† See the generic character of *Mesogloia*.

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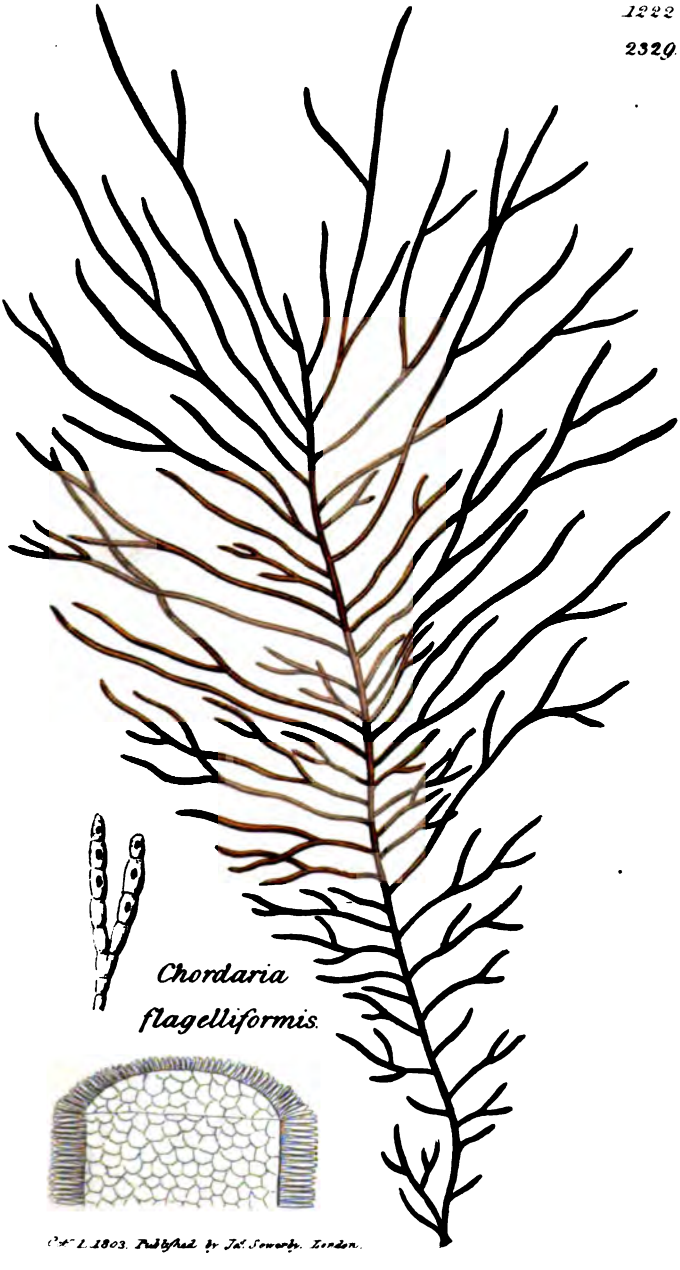

Chordaria flagelliformis.

Oct^r 1. 1803. Publish'd by Ja^s. Sowerby. London.

GENUS DCXVI. CHORDARIA. *Sea Whipcord.*

GEN. CHAR. *Frond* filiform, cartilaginous, continuous, compactly cellular internally; composed exteriorly of a stratum of radiating filaments.

The name, bestowed by Agardh, from the Latin *chorda*, a cord or string, in allusion to the nearly uniform thickness of the slender frond, is objectionable on account of the corresponding derivation of that of the following genus, previously bestowed.

CHORDARIA FLAGELLIFORMIS. *Common Sea Whipcord.* TAB. 2329.

Frond nearly equal in diameter throughout, filiform, branched; branches long, nearly simple, distichous. "Sporules naked among the concentrical filaments."

Fucus flagelliformis, *Fl. Dan. tab.* 650. *E. B.* 1222. *Turner Hist. Fuc. tab.* 85. Chordaria flagelliformis, *Agardh Spec. Alg.* 1. 166. *Greville Alg. Brit.* 44. *tab.* 7. *Hooker Crypt. Part* 1. 275. Gigartina flagelliformis, *Lamouroux.* Fucus longissimus, *Stackhouse.*

Frequent, and abundant on many parts of our coasts. Fronds from a few inches to two or three feet long, about the thickness throughout of very fine twine, bearing numerous alternate, obtuse, simple or slightly divided, subdistichous branches, commencing near the base, the lower ones horizontal, the uppermost nearly erect. The whole plant is slimy to the touch, of a dull brownish-olive hue, changing to black when dry, and adhering to paper.

The concentrical filaments, forming the outer substance, are more or less branched or dichotomous, and the terminal vesicles, and often two or three at the extremity of each filament, have a darkish endochrome; these latter are deciduous. I have sought in vain for the "naked sporules," described as lying among the filaments, but have often seen the detached vesicles, which have at first sight much the appearance of such, partly entangled among them.

The slimy character of the recent plant is due to an exterior covering of extremely delicate filaments, which give it, when growing in the water, the appearance of being invested by mucus.

TRIBE VI. DICTYOTEÆ.

Marine plants, of an olive-green or brownish colour, not changing on exposure to the air, of a membranaceous or subcoriaceous, flexible substance and reticulated structure. Base either scutate, or composed of a mass of woolly filaments. Frond cylindrical or flat; when flat, without a midrib, thin, entire or divided, often flabelliform. Fructification; roundish, ovate, pear-shaped or club-shaped sporules, enveloped in a pellucid case, covering the surface, or scattered, or forming minute spots or transverse lines. The sporules in most cases are produced beneath the epidermis, through which they burst, and become prominent.

Chorda Filum is cartilaginous. The frond in the genus *Haliseris* has a midrib.

GENUS DCXVII. CHORDA. *Chorda.*

GEN. CHAR. *Frond* simple, filiform, cylindrical, interruptedly fistular; fixed by a naked scutate base. *Fructification*; external, continuous masses of pear-shaped sporules fixed by their base.

This genus, established for the purpose of segregating that curious and unique species as to structure, *C. Filum*, occupies the first place among the *Dictyoteæ*, on account of its forming an apparent link between them and the preceding tribes; indeed the external sporules seem to be only a reduced form of the fructifying filaments of the last genus, consisting of a single vesicle instead of a moniliform series. There is, however, no farther parallel between them, notwithstanding the similarity of name.

CHORDA FILUM. *Sea Whip-Lash. Sea Catgut. Sea-Laces.* TAB. **2330.**

Frond cartilaginous, much elongated, attenuated at both extremities; the transverse septa not accompanied by external constriction.

Fucus Filum, *Linn. Turner Hist. Fuc. tab.* 86. *E. B.* 2487. Chorda Filum, *Lamouroux. Greville Alg. Brit.* 47. *tab.* 7. *Hooker Crypt. Part* 1. 276. *Flor. Lond. tab.* 204. Scytosiphon Filum, *Agardh Spec. Alg.* 1. 161.

Very common on all our rocky shores. Fronds solitary, or, more frequently, several together, springing from a small callous disc, simple, cord-like, from one to twenty, or, in deep water, even thirty or forty feet in length, and about a quarter of an inch in diameter in the thickest part, tapering to the extremities; internally tubular, the cavity generally filled with a watery mucus, and interrupted at short intervals, more or less completely, by transverse membranes: in substance it is loosely cellular, and in structure very different from any other known Alga; as was first noticed by Captain Carmichael, who observes, that it is "composed of a simple fillet, one or two lines in breadth, spirally twisted into a filiform tube, formed by the cohesion of its edges;" a circumstance easily proved by passing a piece of strong wire through the longitudinal cavity, in the recent plant, and

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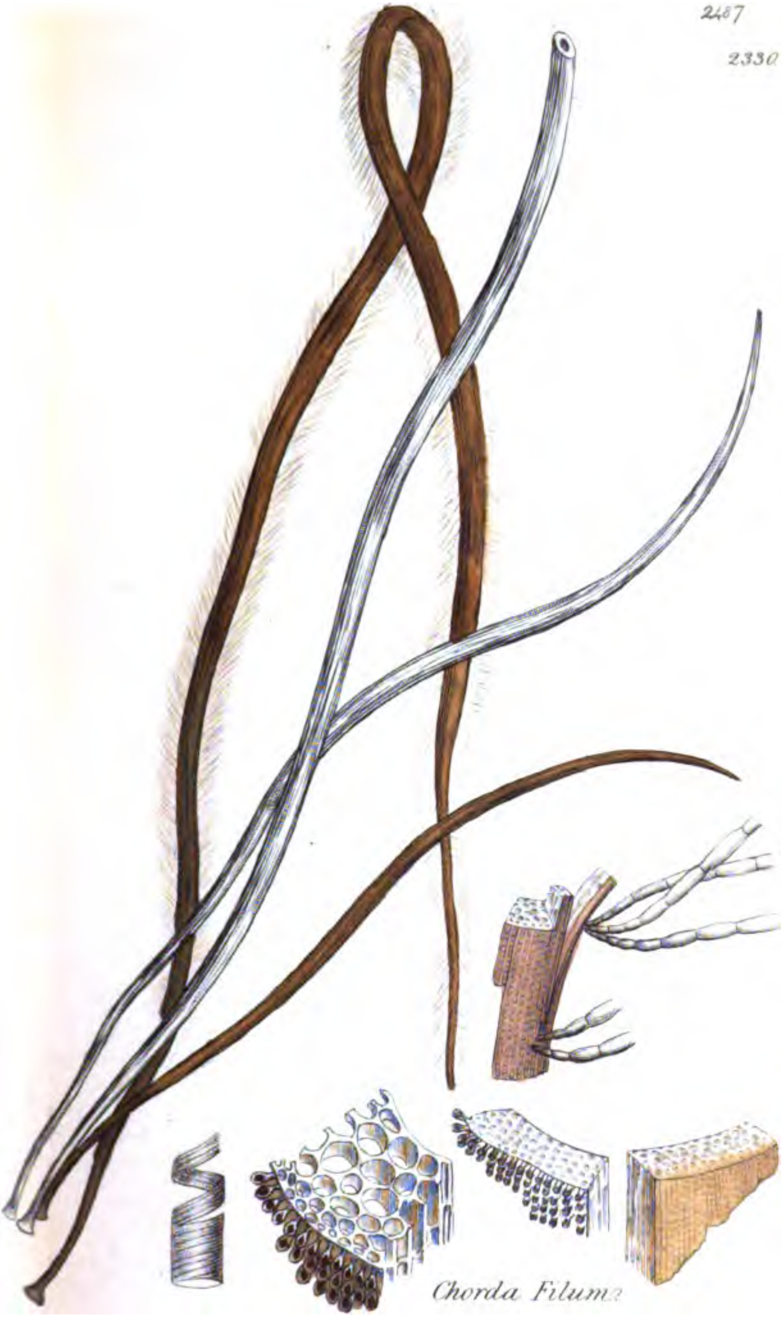

Chorda Filum.

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very evident under a magnifier in the dried one. The fructification often covers nearly the whole length of the frond, and consists of minute pyriform vesicles, including a dark nucleus, which appears to attain maturity towards the end of the autumn. The plant is annual.

The colour is an olive-brown or greenish, and the recent plant is very slimy to the touch, in consequence, partly, of its being covered with very fine, whitish or tawny, jointed hairs. In drying, it adheres very imperfectly to paper.

C. Filum is very abundant on many parts of the coast of Scotland, in some places so much so, that, even in a depth of three or four fathoms, vessels sail with difficulty through the tangled mass. According to Lightfoot, the Highlanders sometimes use it for making their fishing-lines; for which purpose they skin the fronds when half-dry and twist them to the thickness required. In Norway the plant is collected as fodder for cattle.

CHORDA LOMENTARIA. *Jointed Sea Whip-Lash.*

Frond membranaceous, the transverse septa remote and at irregular intervals, accompanied with external constrictions, the intervals somewhat inflated.

Chorda lomentaria, *Lyngbye Hydroph. Dan.* 74. *tab.* 18. *Greville Alg. Brit.* 48. *Hooker Crypt. Part* 1. 276. Scytosiphon Filum, var. γ, *Agardh Spec. Alg.* 1. 162.

According to Dr. Greville, this curious species is abundant both on the western and eastern coasts of Scotland, but on those of England it appears to be rather a local plant, though plentiful in certain habitats. The fronds, of a glossy olive-green or brownish hue and very thin, membranaceous substance, generally grow several together from the same small disc; they vary from a few inches to a foot or more in length, with a diameter of an eighth to a quarter of an inch, and are usually very much attenuated at the lower extremity. The plant is fistular, like *C. Filum,* and furnished with similar transverse partitions; but these are placed at very unequal distances, and occasion contractions in the exterior of the frond, which looks as if girt with ligatures, the intervals being inflated. Dr. Greville mentions the fructification as consisting "of interrupted masses of minute cylindrical or somewhat club-shaped, jointed filaments," connected in pairs by their bases. It is apparently annual.

C. Filum is sometimes constricted at the divisions, either wholly or in part, but its cartilaginous substance is very different from the thin membranaceous character of the present species, although Agardh considered them merely varieties of the same. I am not acquainted with any intermediate state that could justify such a conclusion; indeed *C. lomentaria* has far more the aspect of an *Asperococcus,* and would be referable to that genus but for the interruption of the central cavity.

GENUS DCXVIII. ASPEROCOCCUS. *Asperococcus.*

GEN. CHAR. *Frond* simple, tubular, cylindrical or compressed, continuous, membranaceous; fixed by a minute scutate base. *Fructification*; distinct spots composed of imbedded sporules, mixed with erect, club-shaped filaments.

The name, from the Latin *asper*, *rough*, and the Greek *κόκκος*, *a seed*, is very characteristic of the roughness of the surface in these plants, arising from the fructification, although scarcely orthodox in classical phraseology: the barbarism is however partly redeemed by the adoption of the latter term by Pliny and other authors, though under a somewhat different sense.

A. compressus is not tubular, and should undoubtedly be referred to the following genus, *Punctaria*; if not, I am not aware of any positive distinction between it and the present to justify their separation.

ASPEROCOCCUS FISTULOSUS. *Fistulose Asperococcus. Pipe Laver.* TAB. **2331**.

Frond cylindrical, filiform, tapering at the base, subgelatinous.

Ulva fistulosa, *Hudson*. *E. B.* 642. Asperococcus fistulosus, *Hooker Crypt. Part* 1. 277. A. echinatus, *Greville Alg. Brit.* 50. *tab.* 9. A. rugosus, *Lamouroux*. Encœlium echinatum, *Agardh Spec. Alg.* 1. 145. E. Lyngbyanum, *Greville Crypt. Fl. tab.* 290. Scytosiphon fistulosus, *Lyngbye Hydroph. Dan.* S. Filum, var. fistulosum, *Agardh Spec. Alg.* 1. 163. Conferva fistulosa, *Roth.*

Not unfrequent, especially on rocky coasts, all round Great Britain and Ireland. The simple fronds grow in clusters from a minute disc, varying in height from a few inches to one or two feet, and in diameter from the thickness of a pin to that of a swan's quill; they are attenuated at the lower extremity, generally blunt at the apex, and sometimes partially constricted in places throughout their whole length. When growing the substance seems almost gelatinous, when dry it is membranaceous, and the surface beautifully reticulated under the microscope. The fructification forms little asperities visible to the naked eye, and rendering the dried plant rough to the touch; these consist of minute sporules imbedded in the surface, accompanied by numerous, minute, erect, linear-obtuse, jointed filaments, whose upper vesicles are filled with a darkish endochrome. The plant seems to be annual, and is found in fructification about the end of the summer.

The colour is a pale yellowish-brown or dull olive-green. The plant is often found partly filled with sand. It scarcely adheres to paper in drying.

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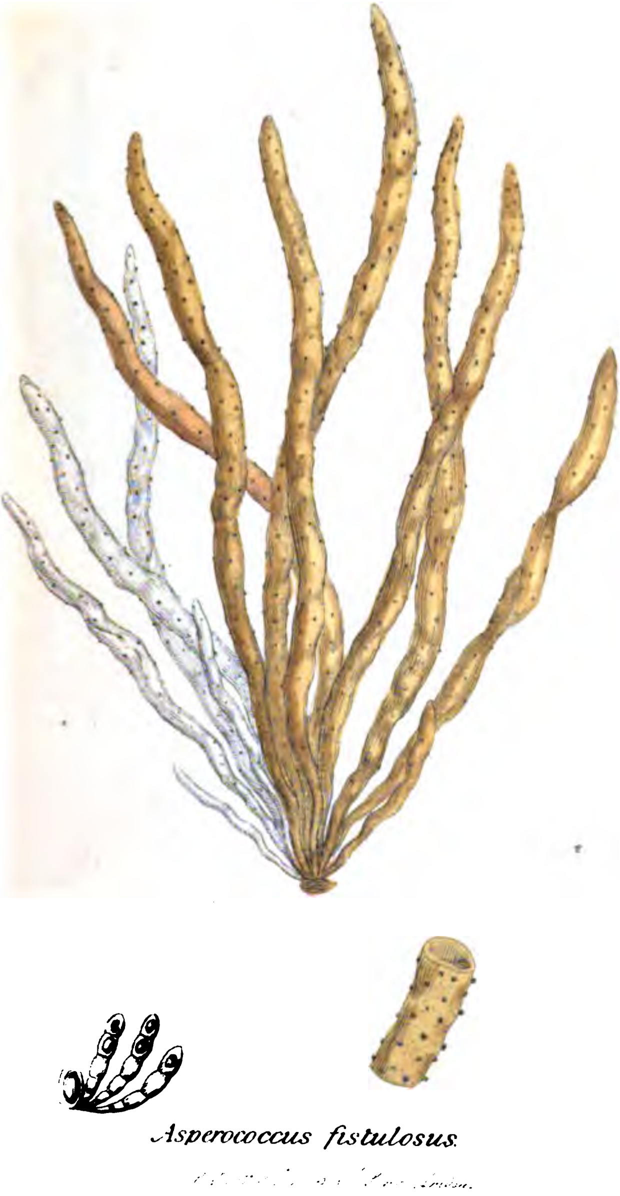

Asperococcus fistulosus.

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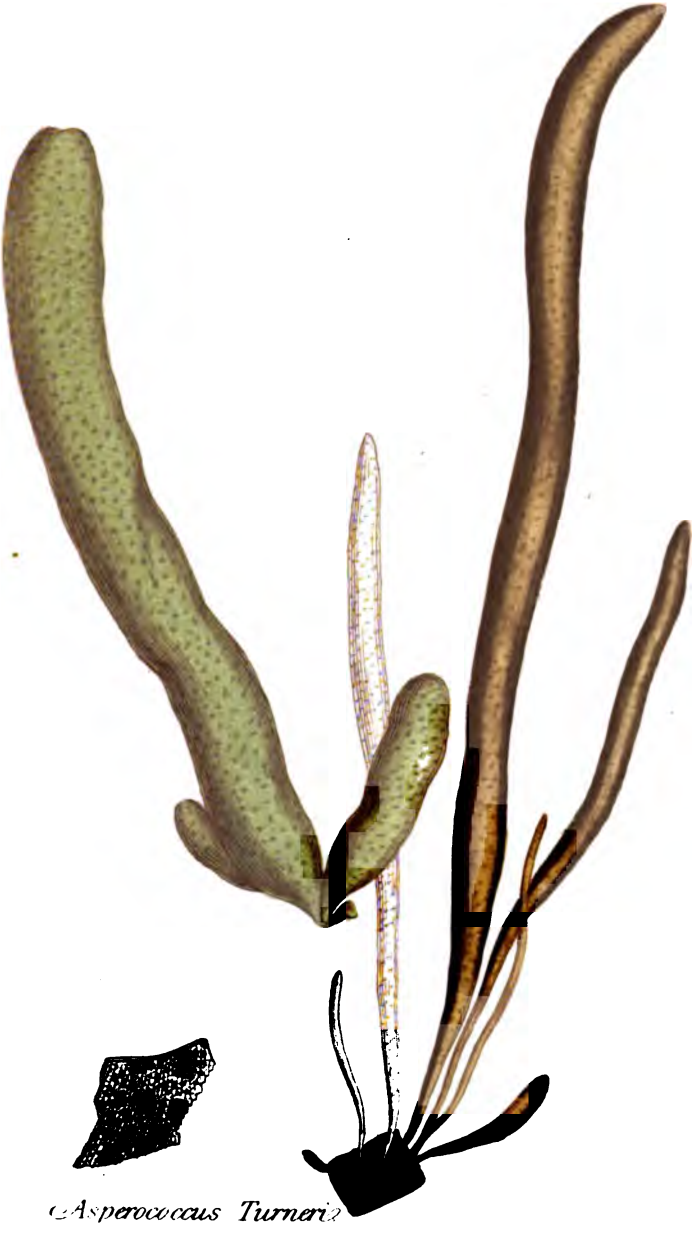

Asperococcus Turneri

Nov 1 18[illegible] published by Jas Sowerby London

ASPEROCOCCUS CASTANEUS. *Red-brown Asperococcus.*

Frond filiform, compressed, coriaceous, red-brown, attenuated at both extremities. Asperococcus castaneus, *Hooker Crypt. Part* 1. 277. Scytosiphon castaneus, *Carmichael in Hooker.*

Found by Captain Carmichael and Dr. Richardson on the coast of Scotland, growing on the leaves of *Zostera marina.* "Fronds gregarious, four to nine inches long and scarcely half a line in diameter, attenuated at both ends, regularly compressed, of a firm substantial texture and deep chestnut colour." No fructification has been observed.

ASPEROCOCCUS PUSILLUS. *Least Asperococcus.*

Frond rounded, capillary, spuriously articulated, brown. Asperococcus? pusillus, *Hooker Crypt. Part* 1. 277.

Found by Captain Carmichael, growing abundantly on *Chorda Filum*, on the coast of Appin, Argyleshire, and by Mrs. Griffiths at Meadfoot, Devonshire. "The fronds of this diminutive species are so closely aggregated as to give to a section of the plant on which they grow the appearance of a bottle-brush. They are from one to two inches long, simple, the thickness of horse-hair, attenuated at both ends, transversely striated as if jointed, and closely beset with pellucid fibres."—*Carmichael in Hooker.*

Not having seen authentic specimens of either this or the preceding, I quote them from the 'British Flora,' but cannot avoid expressing my doubts of their being distinct from *A. fistulosus.* This latter is an exceedingly variable species, and a bunch of its fronds now before me, epiphytic on *Fucus serratus*, from the Isle of Thanet, so exactly accords with the above description of *A. pusillus*, except in not being "closely beset with pellucid fibres," that, but for the presence of perfect fructification, it must be assigned to that supposed species: the fructifying fronds are scarcely thicker than horse-hair; the barren ones, some of them at least, thinner than the finest human hair.

ASPEROCOCCUS TURNERI. *Turnerian Asperococcus.* TAB. **2332.**

Frond cylindrical or subclavate, obtuse, tapering at the base, thin, membranaceous.

Ulva Turneri, *Dillwyn. E. B.* 2570. Asperococcus bullosus, *Lamouroux. Greville Alg. Brit.* 51. A. Turneri, *Hooker Crypt. Part* 1. 277. Encœlium bullosum, *Agardh Spec. Alg.* 1. 146. Gastridium Opuntia, *Lyngbye Hydroph. Dan. tab.* 18.

Generally regarded as rare, but found on various parts of the coast, upon the rocks, and on the fronds of the larger Algæ. The fronds generally grow in clusters like those of *A. fistulosus*, from one to six inches high, and from the thickness of a small crow-quill to that of an inch or more: they are more or less rounded at the apex, turgid, without constrictions, and of a very thin reticulated substance. Fructification forming minute dots scattered over the whole surface, consisting of dark-coloured sporules, accompanied by filaments nearly resembling those of the first species, but shorter and rather pyriform than linear.

Being of thin and transparent substance, of a pale watery-green hue, and when growing filled with water, it is not, as observed by Mrs. Griffiths, readily distinguishable from that medium, unless the light fall upon it at a particular angle; hence it is not probably so unfrequent as generally considered.

Annual. Fructification perfected about the end of the summer.

ASPEROCOCCUS COMPRESSUS. *Compressed Asperococcus.* TAB. 2333.

Frond flat, thickened at the edges, attenuated at both extremities, here and there slightly contracted, gelatinous.

Asperococcus compressus, *Mrs. Griffiths in Hooker Crypt. Part* 1. 278. *Borrer in E. B. Supp.* 2846.

Found only on rocks on the south coast of England. Fronds tufted, springing from a minute disc, from five to ten inches long, much attenuated below and slightly so at the apex, but generally nearly linear through the greater part of their length, varying from an eighth of an inch to an inch in width, flat, except from the edges being rather thicker than the other parts, and consisting of a double membrane connected by a layer of very lax cellular tissue. Fructification in scattered spots, consisting of raised sori of elliptical or subpyriform sporules, without any tufts of filaments. The structure of the membrane is cellular, the cells often arranged with great regularity, and each containing four dark granules; occasionally they are less regular, and the nucleus is undivided.

Annual. Perfecting its fructification during the summer. It is of an olive-green colour inclining sometimes to brownish, not changing much in drying, and adhering firmly to paper, as might be expected from its tender and almost gelatinous substance.

If the following genus be well-founded, which there seems little reason to question, this species ought undoubtedly to be referred to it.

GENUS DCXIX. PUNCTARIA. *Punctaria.*

GEN. CHAR. *Frond* simple, membranaceous, flat, fixed by a naked scutate base. Fructification scattered over the whole frond, in minute distinct spots or sori, composed of roundish prominent sporules, intermingled with club-shaped filaments.

"The frond, besides being flat, is formed of an interlacing of longitudinal and transverse filaments, covered by a finely reticulated membrane."—*Greville.*

Named from the Latin *punctum, a dot,* in allusion to the dotted appearance of the frond when in fructification.

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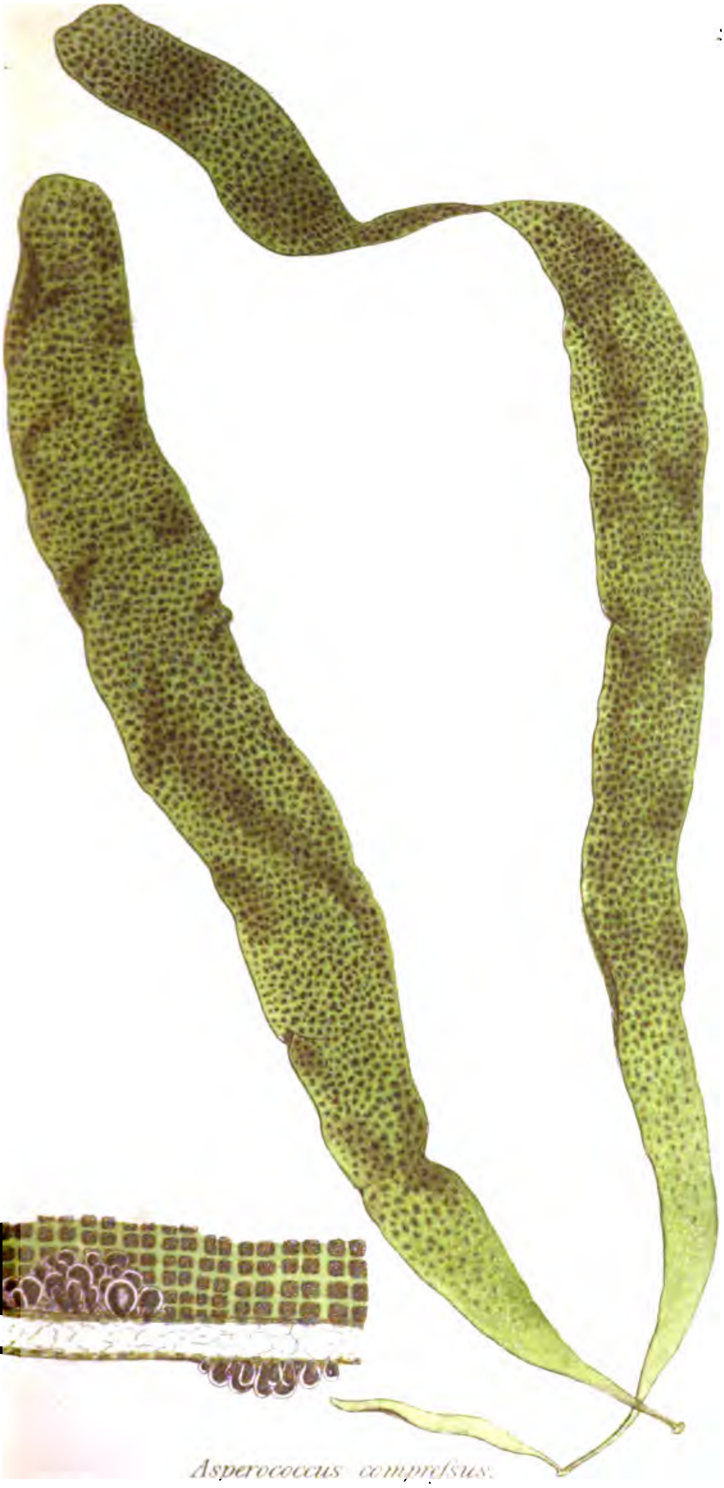

Asperococcus compreſsus.

Oct^r 1^st 1840.

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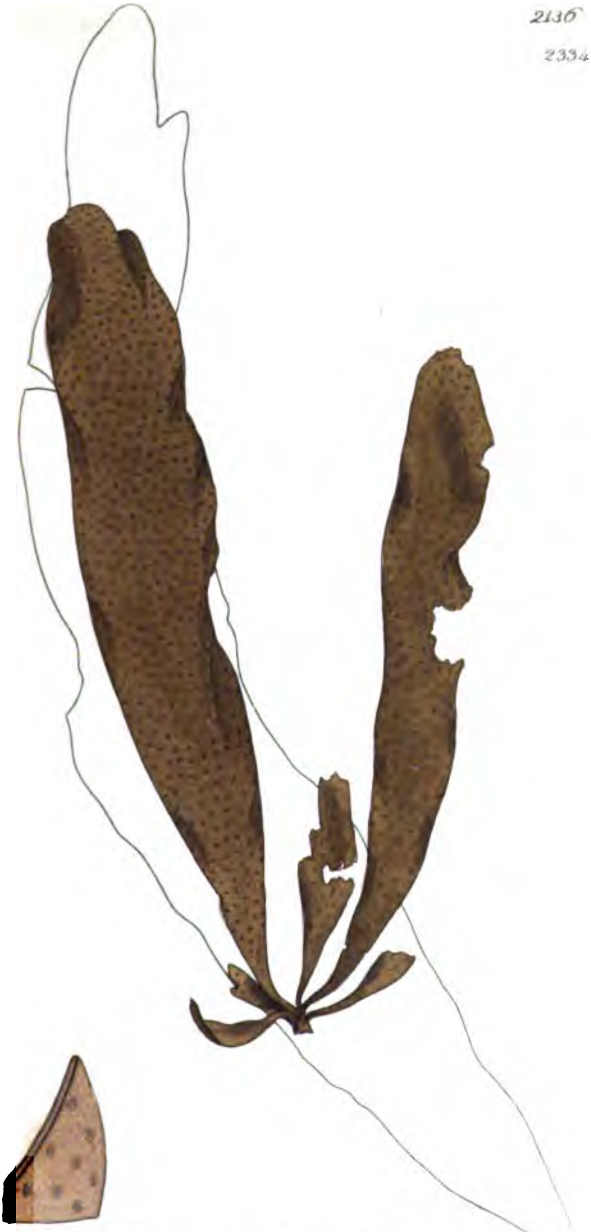
2334.



Punctaria plantaginea

Jn [illegible] published by J. Sowerby London

PUNCTARIA PLANTAGINEA. *Plantain-leaved Punctaria.* TAB. 2334.

Frond linear-oblong, attenuated at the base into a short stipes, subopake.

Ulva plantaginea, *Roth.* *E. B.* 2136. *Lyngbye Hydroph. Dan. tab.* 36. Punctaria plantaginea, *Greville Alg. Brit.* 53. *tab.* 9. *Hooker Crypt. Part* 1. 278. Zonaria? plantaginea, *Agardh Spec. Alg.* 1. 138.

Found attached to rocks, pebbles, and the larger species of Algæ, on various parts of the coast, but not common, and perhaps more frequent at the south-west extremity of England than elsewhere. Fronds more or less aggregated, from three inches to a foot in length and sometimes an inch broad, slightly waved at the margin, "thick and subgelatinous when growing," shrinking much and becoming membranaceous in drying; adhering to paper, but not very firmly, and retaining their original olive or brown hue. Fructification consisting of minute sori of greenish-brown sporules, seldom more than three or four together, accompanied or not by a few short filaments, and often scattered singly over the frond.

The fronds are seldom found entire, being perforated, and often nearly all destroyed by some marine animals. Annual. Fructification in May.

PUNCTARIA LATIFOLIA. *Broad-leaved Punctaria.*

Frond narrow-obovate or oblong, tapering suddenly into a very short stipes, flaccid, subgelatinous.

Punctaria latifolia, *Greville Alg. Brit.* 52. *Hooker Crypt. Part* 1. 278.

Found on rocks in the sea, chiefly on the south coast of England, but occasionally elsewhere. Fronds several from the same base, three to eight inches long and one or two inches wide in the broad part; olive-green, changing to brownish in maturity, the hue little altered in drying: it adheres to paper. Fructification during the summer. Annual.

PUNCTARIA TENUISSIMA. *Delicate Punctaria.*

Frond sublinear, very thin, transparent.

Punctaria tenuissima, *Greville Alg. Brit.* 54. *Hooker Crypt. Part* 1. 279. Zonaria? tenuissima, *Agardh Syst. Alg.* 268. Z. plantaginea, var. tenuior, *Agardh Spec. Alg.* 1. 138. Ulva plantaginea, var. tenuior, *Lyngbye Hydroph. Dan.* 31. *tab.* 6.

Epiphytic on *Zostera marina*, chiefly about the western islands of Scotland. "Common on the coasts of the Isle of Bute."—*Greville.*

The fronds are so thin as to be almost transparent, of a pale greenish hue, sometimes with a slight tinge of red; in drying they adhere to paper. No fructification has been observed. Annual.

The leaves of the *Zostera* are often very beautifully fringed with the delicate narrow fronds of this species, which are sometimes six or eight inches in length, and remarkable for their elegantly reticulated structure.

GENUS DCXX. STRIARIA. *Striaria.*

GEN. CHAR. *Frond* filiform, tubular, continuous, membranaceous, branched; fixed by a small scutate base. *Fructification*; groups of roundish sporules forming transverse lines.

This genus, founded by Dr. Greville upon the following solitary, and so far as hitherto observed, rare species, is named from the transversely striated appearance of the slender frond, arising from the disposition of the minute sori of fructification. "It differs from the preceding genus in its tubular and branched frond, and in the uniformly transverse disposition of the groups of sporules, which to the naked eye appear as lines. From the following one it differs in the last-named character, and in the more highly reticulated structure."

STRIARIA ATTENUATA. *Attenuated Striaria.*

Striaria attenuata, *Greville Crypt. Fl.* (*Synopsis*) 44. *Alg. Brit.* 55. *tab.* 9. *Hooker Crypt. Part* 1. 279. Carmichaelia attenuata, *Greville Crypt. Fl. tab.* 288.

Apparently rare, having been hitherto found only on the western coast of Scotland, at Belfast in Ireland, and on the shore of the Isle of Man: but being a very slender and fragile species, and always epiphytic on Algæ of slender growth, it is perhaps often overlooked*. Fronds from two or three inches to a foot in length, subcapillary, much branched, the branches generally opposite; the divisions all attenuated at both extremities. Groups of sporules prominent, "occasionally mixed with a few short obtuse filaments."

Pale olive-green. Adheres to paper in drying. Annual.

GENUS DCXXI. DICTYOSIPHON. *Dictyosiphon.*

GEN. CHAR. *Frond* filiform, tubular, continuous, branched; fixed by a minutely scutate base. *Fructification*; ovate, scattered sporules, lying beneath the epidermis.

A genus established by Dr. Greville, like the last, for a single known species, and named from the Greek *δίκτυον*, *a net*, and *σίφων*, *a tube*, in allusion to the tubular and reticulated structure of the frond. Its author observes: "It was my wish

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* This opinion is not without foundation: I have specimens of *Rhodomenia pinastroides*, preserved in brine, collected some years back either at Margate or Hastings, on which several fragments of *Striaria* in fructification are attached.

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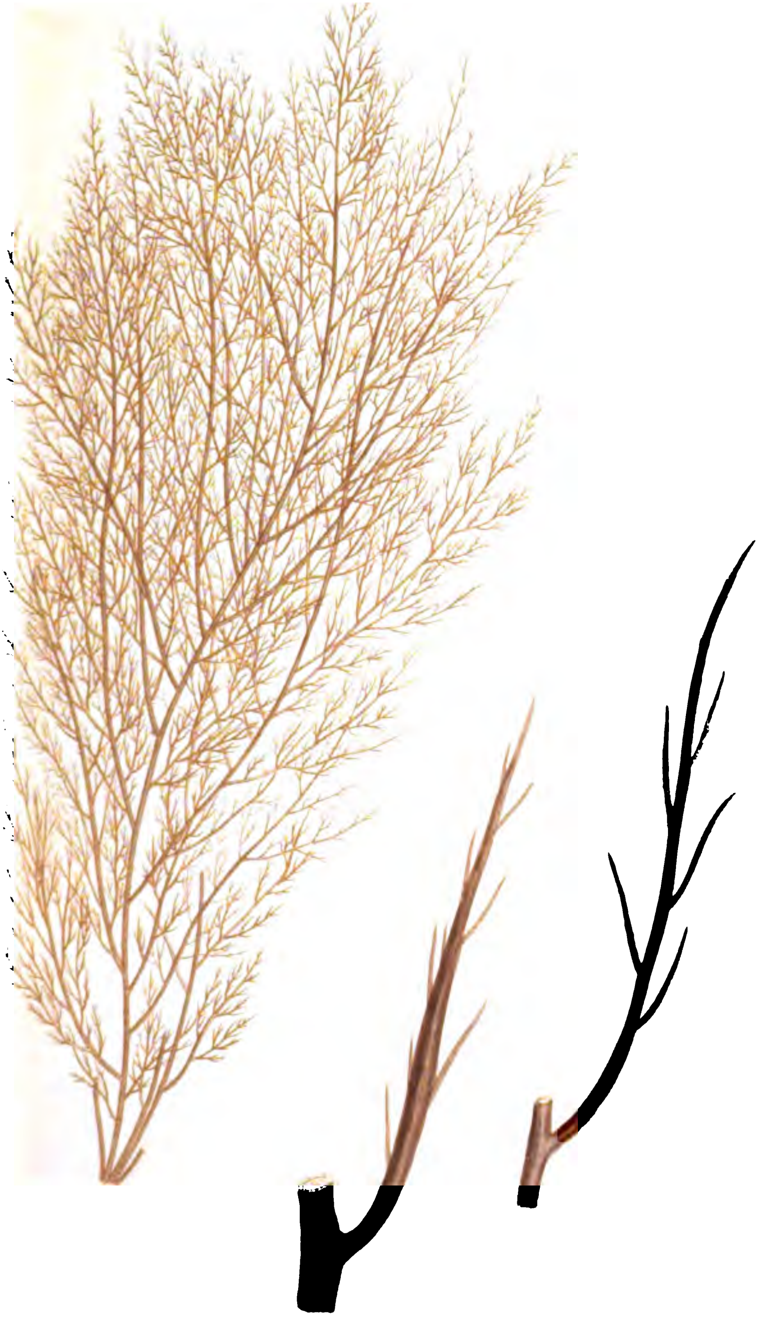

Dictyosiphon fœniculaceus

June 1st 1852

to have formed a single genus of this and the preceding plant, and perhaps farther observation may discover reason for their union. At present, however, the difference in fructification, the exceedingly branched frond, the branches quite capillary and not attenuated at their origin, and the different substance of the plant before us, induce me to keep them asunder."

DICTYOSIPHON FŒNICULACEUS. *Fennel-like Dictyosiphon* TAB. **2335.**

Dictyosiphon fœniculaceus, *Greville Alg. Brit.* 56. *tab.* 8. *Hooker Crypt. Part* 1. 279. *J. D. C. Sowerby in E. B. Supp.* 2746. Scytosiphon fœniculaceus, *Agardh Spec. Alg.* 1. 163. Fucus subtilis, *Turner Hist. Fuc. tab.* 234. Conferva fœniculacea, *Linn. Hudson.*

Epiphytic on *Chorda Filum* and some other Algæ on many parts of the coast, but most common in the North, and especially on the western shores and islands of Scotland. Fronds generally several from the same base, composed of capillary branches, sometimes above two feet long, and united below into a short thick stem: the principal branches not much thicker than a bristle; the second set smaller than the first, irregularly placed, sometimes two or three near together; a third set is smaller, proportionally shorter, and in perfect specimens clothed with ramuli from a quarter to half an inch in length, and throwing out from their sides and ends minute, jointed, viscid fibres, that adhere to paper when dried upon it, which the rest of the plant hardly does. Colour brownish-olive or greenish, scarcely changed in drying. Annual.

Very much like *Dichloria viridis* when perfect, but readily distinguished by its branches being scattered instead of uniformly opposite and pinnate, as they are in that species.

"It varies prodigiously in length, ranging from one to fifteen feet; the latter proved by actual measurement."—*Carmichael in Hooker.*

"The fructification requires close observation and a high power of the microscope."—*Greville.*

GENUS DCXXII. DICTYOTA. *Dictyota.*

GEN. CHAR. *Frond* flat, highly reticulated, membranaceous, dichotomous or irregularly cleft; springing from a base of woolly filaments. *Fructification* composed of scattered or variously aggregated, somewhat prominent sporules on both sides of the frond.

In *D. atomaria* the frond is between palmate and flabelliform.

About a dozen known species rank under this beautiful genus, but only two are to be met with in our seas, the rest belonging to those of warmer latitudes. The plants are all of a thin, membranaceous substance, and remarkable for the delicacy and regularity of their reticulated structure. The sporules, produced indifferently on both sides of the frond, "are generally scattered, hardly ever forming transverse lines, and when they do so they are not regular ones: they at length burst through the epidermis, enveloped in their pellucid cases." —*Greville.*

The name, like that of the last genus, is from the Greek *δίκτυον*.

DICTYOTA DICHOTOMA. *Dichotomous Dictyota.* TAB. **2336.**

Frond linear, regularly dichotomous. Sporules scattered singly or in small irregular clusters.

Ulva dichotoma, *Lightfoot.* *E. B.* 774. Dictyota dichotoma, *Lamouroux.* *Greville Alg. Brit.* 57. *tab.* 10. *Hooker Crypt. Part* 1. 280. Zonaria dichotoma, *Agardh Spec. Alg.* 1. 133. *Grev. Fl. Edin.* 297. Haliseris dichotoma, *Sprengel.*

Frequent on rocks, as well as epiphytic on the larger Algæ. Fronds solitary or clustered, two to nine inches or more in height, various in breadth, many times dichotomous from the very base; all the divisions linear, entire at the margin, and blunt and generally notched at the extremity. Fructification in most specimens ovate, solitary sporules scattered over the frond beneath the epidermis; but in others, as first observed by Mrs. Griffiths, making its appearance in the form of "transparent vesicles rising above the surface; as they advance in age a line of dark grains is seen within them, and they at length are filled with capsules, which form groups, and rise above the surface when ripe." In this latter state the sori generally are disposed in longitudinal and parallel series, as shown in our figure, and the capsules or thecæ, closely wedged together, contain each a single sporule.

Some botanists make a variety of the narrow state figured on our Plate, which is however equally common with the broad one, as are likewise intermediate specimens.

It is a very beautiful and delicate species, adhering to paper in drying, and altering but little in colour. Annual. Fructification in the summer.

DICTYOTA ATOMARIA. *Transverse-lined Dictyota.* TAB. **2337.**

Frond palmato-flabelliform, irregularly cleft and laciniated. Fructification in waved transverse lines, with intermediate scattered sporules.

Ulva atomaria, *Woodward.* *E. B.* 419. Dictyota atomaria, *Greville Alg. Brit.* 58. D. zonata et D. ciliata, *Lamouroux.* Zonaria atomaria, *Agardh Spec. Alg.* 1. 128. *Grev. Fl. Edin.* 298.

Somewhat rare, and chiefly met with on the eastern and southern coasts of England. Fronds often several together, from four to eight or ten inches long, dilating upwards into a wedge or fan shape, various in breadth, deeply divided in a subpalmate manner into a few large segments, which are again irregularly cleft and often variously laci-

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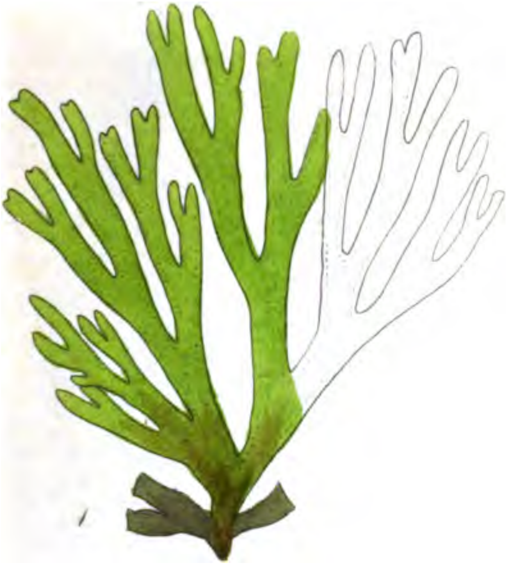
2336



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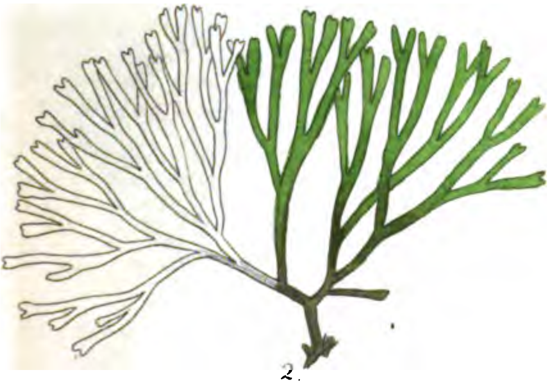
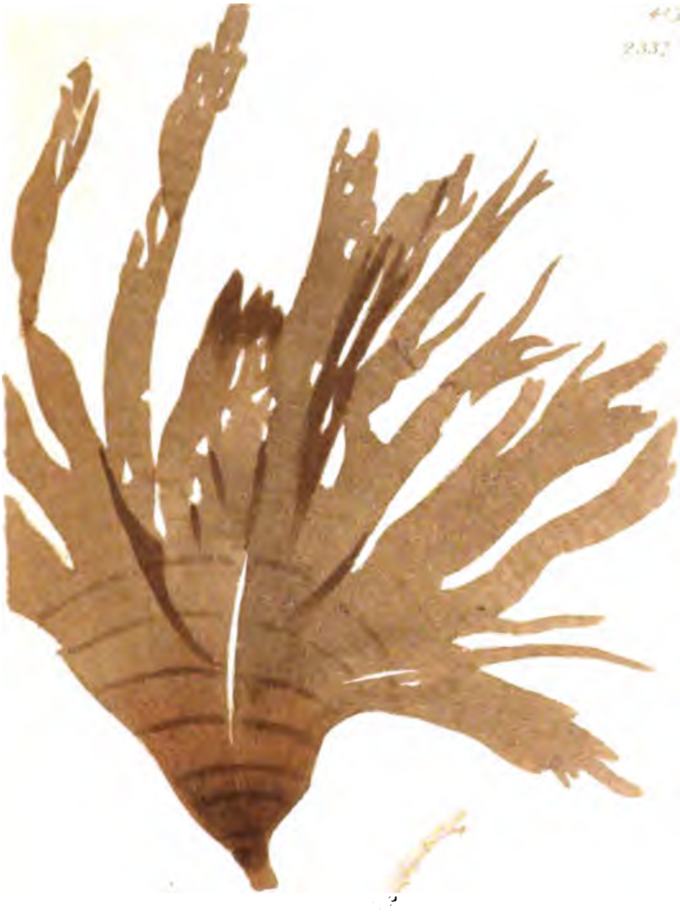


2.

Dictyota

dichotoma?

2337



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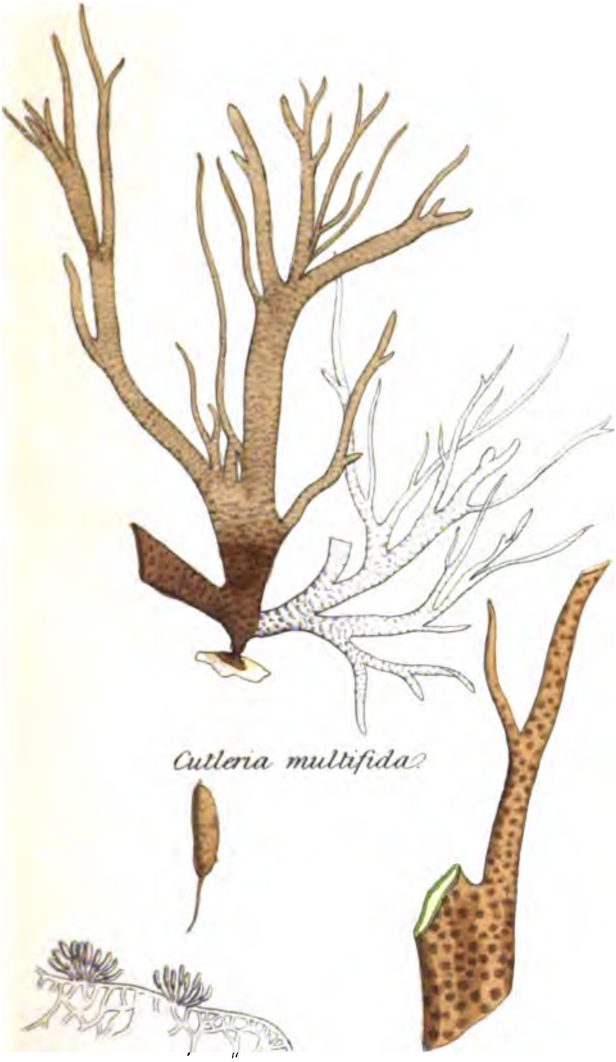


Cutleria multifida

July 1 1808 Publish'd by Jas Sowerby London.

niated; all of the more ultimate divisions linear, with blunt terminations, sometimes entire on the margin, but often fringed with minute teeth pointing upwards, as shown in our lower figure. The whole is of a thin and membranaceous substance, and of a pale but often bright olive-green or brownish hue, scarcely altered by drying: it adheres firmly to paper. Fructification consisting of ovate, dark-coloured sporules, lying, invested by their pellucid cases or thecæ, beneath the cuticle, some disposed in numerous transverse undulating lines, arranged in a somewhat concentric manner, others scattered singly in the intervals. Annual. A summer species.

A highly beautiful plant but seldom found entire, unless growing on its native rocks in deep pools, or taken up from below low water-mark, the frond being usually much broken by the waves.

There is some superficial resemblance between this species and the *Padinæ* (genus 624), with which it has been associated by some botanists; but Dr. Greville remarks that the frond does not form a regular segment of a circle in its general outline, and that the margins of its divisions exhibit no traces of laceration, but are often denticulate, and evidently independent in every stage of growth of the margin of the adjoining one. The lines of fructification also differ greatly from the truly concentrical ones of the genus in question.

GENUS DCXXIII. CUTLERIA. *Cutleria.*

GEN. CHAR. *Frond* plano-compressed, cartilagino-membranaceous, subflabelliform, irregularly cleft; springing from a base of woolly filaments. *Fructification*; minute tufts of pedicillate, polyspermous thecæ, scattered on both sides of the frond.

The single and rare species on which this genus is founded was separated by Dr. Greville from the preceding, to which it was referred by Lamouroux. In general habit and outline it comes near to *D. atomaria*, but the texture of the frond is very different, and the fructification has no resemblance to that of *Dictyota* or any other genus of the section.

Named by its founder in commemoration of Miss Cutler of Sidmouth, a lady zealously devoted to the study of marine botany, and to whom we owe the discovery of *Grateloupia filicina* as an inhabitant of the British shores.

CUTLERIA MULTIFIDA. *Multifid Cutleria.* TAB. 2338.

Ulva multifida, *E. B.* 1913. Cutleria multifida, *Greville Alg. Brit.* 60. *tab.* 10. *Hooker Crypt. Part* 1. 281. Zonaria multifida, *Agardh Spec. Alg.* 1. 135. Dictyota penicillata, *Lamouroux.* Sporochnus multifidus, *Sprengel.*

Rare. The only place mentioned in the published catalogues of our marine plants as having afforded it is Yarmouth beach, where it was found in 1804 by Mr. Turner, and first described and figured in 'English Botany' from his specimen, which was not gathered from the rocks but cast on shore, as has been the case with those since procured from the same locality; on looking over, however, the herbarium of Mr. Sowerby, I find a specimen labelled in the handwriting of his correspondent Miss Biddulph, as having been taken up in a trawl-net near Southampton in 1802. From these circumstances it appears to be an inhabitant of deep waters, where it is not liable to be disturbed unless in very stormy weather, which will account for its being so rarely met with. The frond is rather compressed than flat, as shown in the magnified portion on our Plate; and though very thin and membranaceous when dried on paper, to which it adheres, is in a recent state somewhat cartilaginous. In general outline it is broadly flabelliform, dividing near the base into from three to five principal lobes, which are repeatedly and subdichotomously branched, the ultimate segments very narrow and numerous, all nearly linear, but slightly dilating upwards. Fructification thickly but irregularly scattered over the frond in small round clusters, sufficiently prominent to render it rough to the touch, though so minute as to be scarcely visible to the naked eye, unless as giving a speckled appearance to the frond generally: when highly magnified they are seen to consist of oblong thecæ supported on very slender stalks, and containing, as if in so many distinct vesicles, eight or ten dark-coloured granules. Probably annual, and perfecting about the end of the summer.

The frond is of a pale yellowish or reddish-brown colour, from three to eight inches long and about the same breadth.

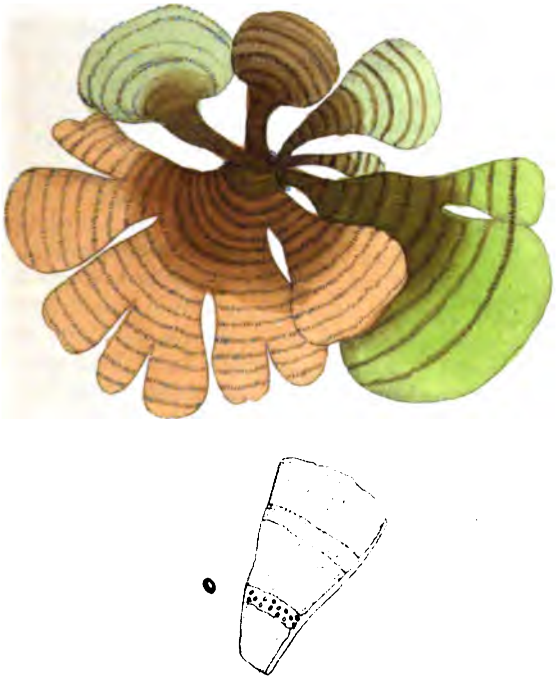
GENUS DCXXIV. PADINA. *Padina.*

GEN. CHAR. *Frond* flat, highly reticulated, subcoriaceous, flabelliform, mostly undivided, marked with concentric lines; fixed by a base of woolly filaments. *Fructification*; ovate, blackish sporules, fixed by their base, bursting through the epidermis in compact, concentric lines, or rarely spots, mostly on one surface of the frond.

This curious genus is of very uncertain extent, most of the species being exotic, little known, and perhaps scarcely according with the above character, which is founded on *P. Pavonia*, the most common of the European species. The plants, though resembling the rest of the *Dictyoteæ* in the beauty and delicacy of their cellular structure, differ greatly from them in that uniform tendency to concentrical development which causes them to assume a rounded or flabelliform outline. "Some few exotic species have a divided frond; each segment, however, resembles on a smaller scale the entire frond of the

1276

2339



Padina pavonia?

Feb. 1 1804. Published by Ja.s Sowerby, London

other species, being curved at the lateral angles into a flabelliform or reniform outline. The concentrical lines appear to be the result of an accumulation of the vegetable matter in the cellules, which at certain intervals assume a wedge-shaped form, a dense consistence and dark opake colour. It is probable that this repeated and abrupt condensation of the vegetable matter is an attempt towards the development of the fructification, for it is in one or more of these lines that the thecæ are generally produced." Dr. Greville, by these remarks, seems to entertain a very erroneous notion of the development of our British species at least, which, being a native only of the southern shores of England, he had probably not had an opportunity of examining in a recent state. The concentrical lines in *Padina Pavonia* represent the terminations of so many successive stages of growth, and the places whence the so-called revolute or folded margin of the frond has fallen away from time to time: the rudimental state of the fructification exists beneath the fold; and as it requires more than one season, sometimes three or four, to perfect it, the upper lines appear to be abortive, as do likewise the lower, in consequence of their having passed the period of production; indeed you rarely find more than one fertile line at the same time on each frond, and when two are present, it is only in consequence of the lower line not having perfectly matured all its sporules during the preceding season. The margin of the frond is always double, but not from being folded back, such appearance being due to the presence there of the deciduous membrane overlying the parts eventually fructiferous; indeed it is surprising that it should ever have been described as revolute.

The derivation of the generic name, bestowed by Adanson, who first separated these plants from the *Fuci* and *Ulvæ* of other authors, is unknown.

PADINA PAVONIA. *Peacock's-tail Pavonia.* TAB. **2339.**

Frond broadly flabelliform or reniform, entire or dichotomously divided, more or less pulverulent, with numerous concentric lines; margin fringed.

Ulva Pavonia, *Linn.* *E. B.* 1276. Padina Pavonia, *Lamouroux.* *Greville Alg. Brit.* 62. *tab.* 10. *Hooker Crypt. Part* 1. 281. Zonaria Pavonia, *Agardh Spec. Alg.* 1. 125.

Frequent on the southern coast of England, growing chiefly in rocky pools where the water is still and exposed at low tide, not only at the south-western extremity of the island, but at Margate, Dover, and other places along the shores of Kent and Sussex. Frond between membranaceous and coriaceous, presenting various shades of brown, and yellowish or reddish-olive, which, with the numerous

other species, being curved at the lateral angles into a flabelliform or reniform outline. The concentrical lines appear to be the result of an accumulation of the vegetable matter in the cellules, which at certain intervals assume a wedge-shaped form, a dense consistence and dark opake colour. It is probable that this repeated and abrupt condensation of the vegetable matter is an attempt towards the development of the fructification, for it is in one or more of these lines that the thecæ are generally produced." Dr. Greville, by these remarks, seems to entertain a very erroneous notion of the development of our British species at least, which, being a native only of the southern shores of England, he had probably not had an opportunity of examining in a recent state. The concentrical lines in *Padina Pavonia* represent the terminations of so many successive stages of growth, and the places whence the so-called revolute or folded margin of the frond has fallen away from time to time: the rudimental state of the fructification exists beneath the fold; and as it requires more than one season, sometimes three or four, to perfect it, the upper lines appear to be abortive, as do likewise the lower, in consequence of their having passed the period of production; indeed you rarely find more than one fertile line at the same time on each frond, and when two are present, it is only in consequence of the lower line not having perfectly matured all its sporules during the preceding season. The margin of the frond is always double, but not from being folded back, such appearance being due to the presence there of the deciduous membrane overlying the parts eventually fructiferous; indeed it is surprising that it should ever have been described as revolute.

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Frequent on the southern coast of England, growing chiefly in rocky pools where the water is still and exposed at low tide, not only at the south-western extremity of the island, but at Margate, Dover, and other places along the shores of Kent and Sussex. Frond between membranaceous and coriaceous, presenting various shades of brown, and yellowish or reddish-olive, which, with the numerous darker concentrical lines, and a white bloom-like powder, spread over and more or less modifying the multiplied hues, renders this one of the most beautiful and remarkable of all our marine vegetables. Several generally rise from the same base in erect or slightly spreading tufts, seldom more than two or three inches high, mostly entire, but often dividing, especially in old and large specimens, in a subdichotomous manner; the divisions apparently not primary but arising from laceration, the concentrical lines being continued in the same curve through all of the segments; the margin fringed with minute confervoid filaments. Perennial. Fructification in the autumn.

The sporules are ovate, dark-coloured, and invested individually in a pellucid case, as in the rest of the plants of this tribe.

It adheres imperfectly to paper in drying.

PADINA PARVULA. *Small Padina.*

"Frond resupinate, suborbicular, membranaceous, deeply lobed; lobes orbicular, somewhat imbricated; scarcely at all marked with concentrical lines."

Zonaria parvula, *Greville Crypt. Fl. tab.* 360. Padina parvula, *Grev. Alg. Brit.* 63. *Hooker Crypt. Part* 1. 282.

Found near Sidmouth in March. "Frond attached by its inferior surface to the rocks by means of a short, whitish pubescence; the reticulations quadrangular, twice as long as they are broad. Colour olivaceous-green. In drying it does not adhere to paper, and becomes a little darker."—*Greville.*

I am unacquainted with this species, unless from the figure and description quoted. Dr. Greville describes from immature specimens an inch or an inch and a half in width. Either the same or a kindred species, but of considerably larger growth, is mentioned in the 'British Flora' as found by Mr. Harvey on rocks near low water mark, at Miltown Malbay, Ireland, who observes: "The reticulation on our plant is different; yet they quite accord in habit, resembling a *Marchantia*, creeping by its white radicular fibres over a space of a foot or more in diameter, sometimes very closely attached to the rock, at others comparatively loose. In structure both plants are true *Dictyoteæ*. The reticulation in my plant is less regular than in Dr. Greville's, and the meshes are shorter than they are broad. If distinct, I propose to call mine *P. decumbens*."—*Harvey in Hooker.*

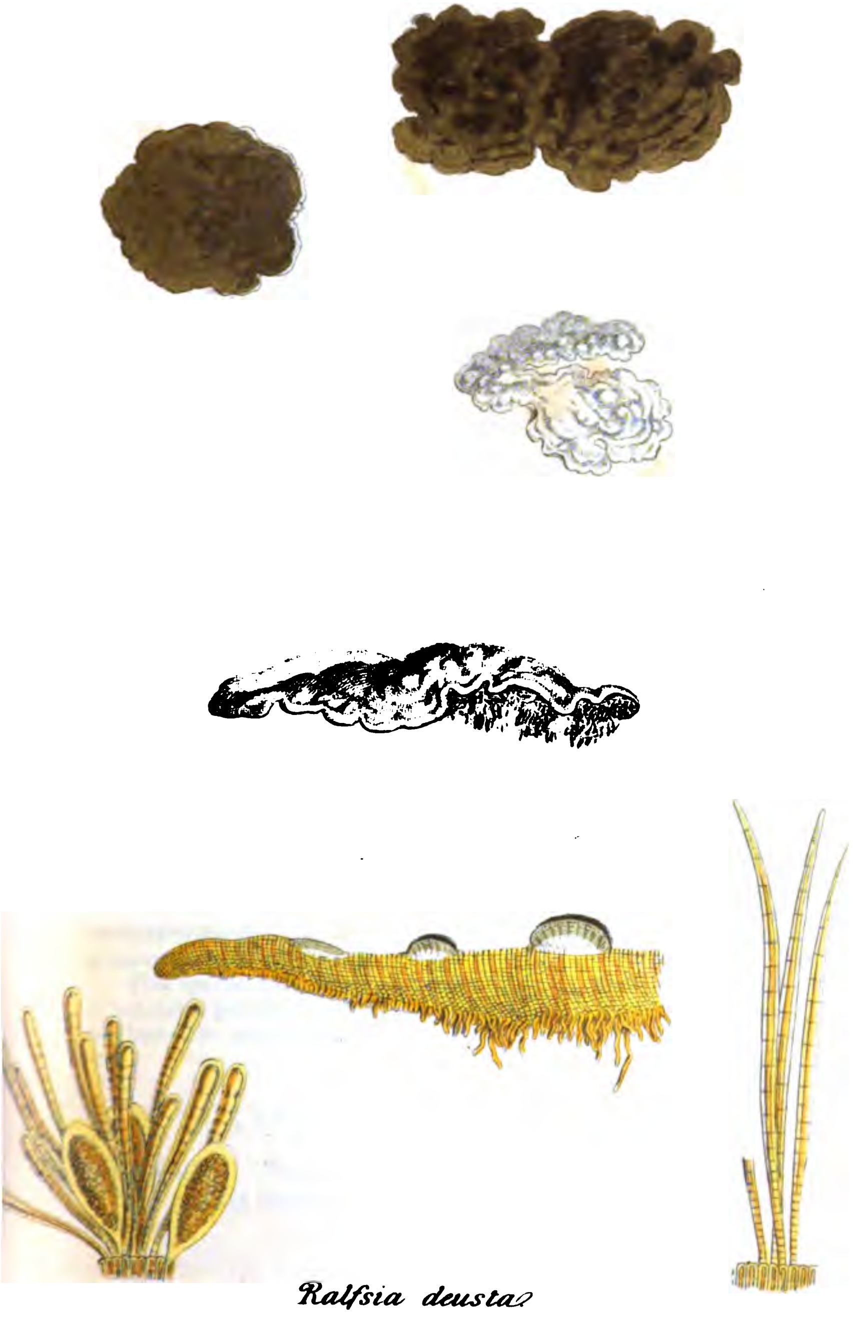
As no fructification seems to have been met with on either of these plants, notwithstanding their structural affinity, they are very doubtful *Padinæ*.

GENUS DCXXV. RALFSIA. *Ralfsia.*

GEN. CHAR. *Frond* flat, more or less squamæform, coriaceous, composed of vertical fibres, not simply reticulated. *Fructification*; hemispherical tubercles, consisting of articulated clavate filaments, and oblong sporules situated at their base.

2866.

2341.



Ralfsia deusta.

Novr. 1st 1841.

In placing this genus after *Padina* I am rather guided by the previous reference to the latter of the species on which it is founded, than satisfied of this being its true relative position. The structure as represented on our Plate is, it will be seen, totally different from that of the true *Padinæ*, in which the frond is erect, and increases by the longitudinal extension of the cellular fabric at the extremities of the previously formed series, not, as in the present instance, by the lateral addition of new vertical articulated fibres, the bases of which, eventually extending, form the medium by which the horizontal fungus-like mass attaches itself to the rocks. Are not *Padina parvula* of Dr. Greville and Mr. Harvey's plant above referred to, belonging to this genus?

Named by the Rev. M. J. Berkeley in compliment to his friend Mr. J. Ralfs of Penzance, a very zealous and able algologist.

RALFSIA DEUSTA. *Fungiform Ralfsia.* TAB. 2341.

Fronds entirely resupinate, more or less orbicular, eventually confluent, deep brown, clothed beneath with scattered rusty down.

Ralfsia deusta, *Berkeley in E. B. Supp.* 2866. Padina deusta, *Hooker Crypt. Part* 1. 281. Zonaria deusta, *Agardh Spec. Alg.* 132. Fucus deusta, *Fl. Dan. tab.* 420.

Found on rocks near high water mark in Berwick Bay and other places in the North. Fronds an inch to an inch and a half broad, attached by their whole under surface, orbicular; eventually, owing to the confluence of many individuals, forming irregular, slightly lobed masses; thin, coriaceous, obscurely zoned above, rugose and warty, dark brown; below partially clothed with rusty down. Substance consisting of closely set, cellular, vertically arranged filaments, occasionally stratose, which when viewed by transmitted light are of a beautiful golden-brown. Fructification; hemispherical, gelatinous tubercles, consisting of clavate, shortly articulated, yellow-brown filaments, bearing at their base obovate sporules, consisting of a grumous mass surrounded by a broad pellucid border.

It appears confined to the more northern parts of Europe, and though specifically distinct, is nearly allied to *Zonaria squamaria* of the Mediterranean. It likewise bears a great resemblance to *Myrionema strangulosa*.—*M. J. B.*

"This species much resembles a *Thelephora*. I believe it belongs to a distinct genus, of which I doubt not there are many species often overlooked as crustaceous zoophytes."—*Harvey in Hooker.*

GENUS DCXXVI. HALYSERIS. *Halyseris Sea-Endive.*

GEN. CHAR. *Frond* flat, linear, membranaceous, with a midrib; arising from a base of woolly filaments. *Fructification*;

ovate sporules, forming distinct sori or groups, mostly arranged in longitudinal lines. Named from ἅλς, *the sea*, and σέρις, *endive*; the English name of the typical species is Sea-Endive.

The fructification is sometimes scattered over the frond in single sporules instead of forming sori. The substance is highly reticulated, and the cellules are arranged obliquely from the midrib to the margin; hence the direction in which the membranous part always lacerates. Not more than five or six species are known.

Lamouroux named the genus *Dictyopteris*, from the resemblance of the groups of fructification to those of the Ferns.

HALYSERIS POLYPODIOIDES. *Polypodium-like Halyseris or Sea-Endive.* TAB. **2340.**

Frond dichotomous, entire at the margin, obtuse at the apex. Sori linear-oblong, forming a line on each side of the midrib.

Fucus membranaceus, *Stackhouse Ner. Brit. tab.* 6. *E. B.* 1758. *Turner Hist. Fuc. tab.* 87. Halyseris polypodioides, *Agardh Spec. Alg.* 1. 142. *Greville Alg. Brit.* 64. *tab.* 8. Dictyopteris polypodioides, *Lamouroux.*

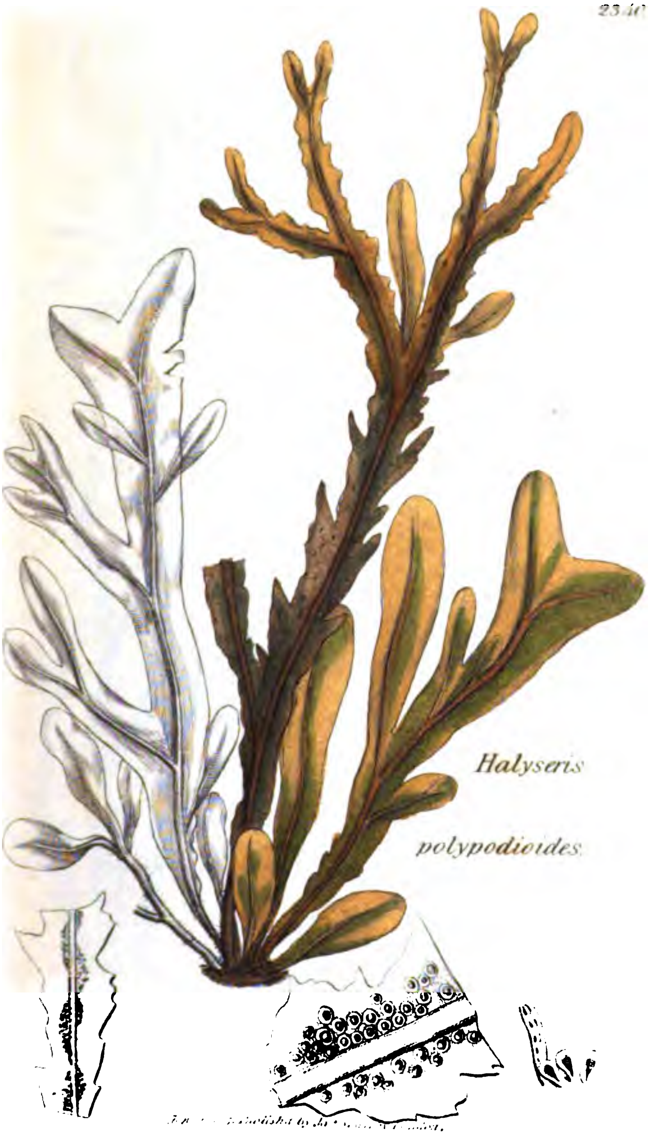
Found on rocks near low water mark, and sometimes growing on the larger Algæ, on many parts of the coast, but most frequently on that of the South of England; in the North it is comparatively rare. The fronds generally grow in clusters from the spreading mass of woolly filaments which constitutes the base of the plant, varying in height from a few inches to a foot, with a breadth of about half an inch. They are of a light greenish-brown hue, very thin, with a strong midrib, more or less dichotomously divided and obtuse at the apex; when old, generally jagged and torn at the margin, and always in an oblique direction downward towards the midrib. Fructification various in different specimens, the sporules, each invested by its translucent case, being either collected in sori and accompanied by a few articulated clavate filaments, or scattered singly over the frond; while a third form, probably abortive, exhibits dark specks here and there dispersed in pale blotches surrounded by a dark, wavy and irregular line. This latter has all the appearance of a diseased state of the plant, the blotches being more transparent than the other parts, and the dark line that bounds them seeming to indicate a rupture of the delicate outer membrane, removed from the blotches either by decay, or devoured by some minute mollusk or animalcule.

When taken fresh from the sea it has a very strong and disagreeable odour. It does not adhere to paper in drying. Perennial. Fructification in the latter part of the summer.

The plant is often proliferous, the young fronds springing from the membranaceous part near to the midrib, but, as observed by Dr. Greville, not from it.

1758

2340



Halyseris polypodioides.

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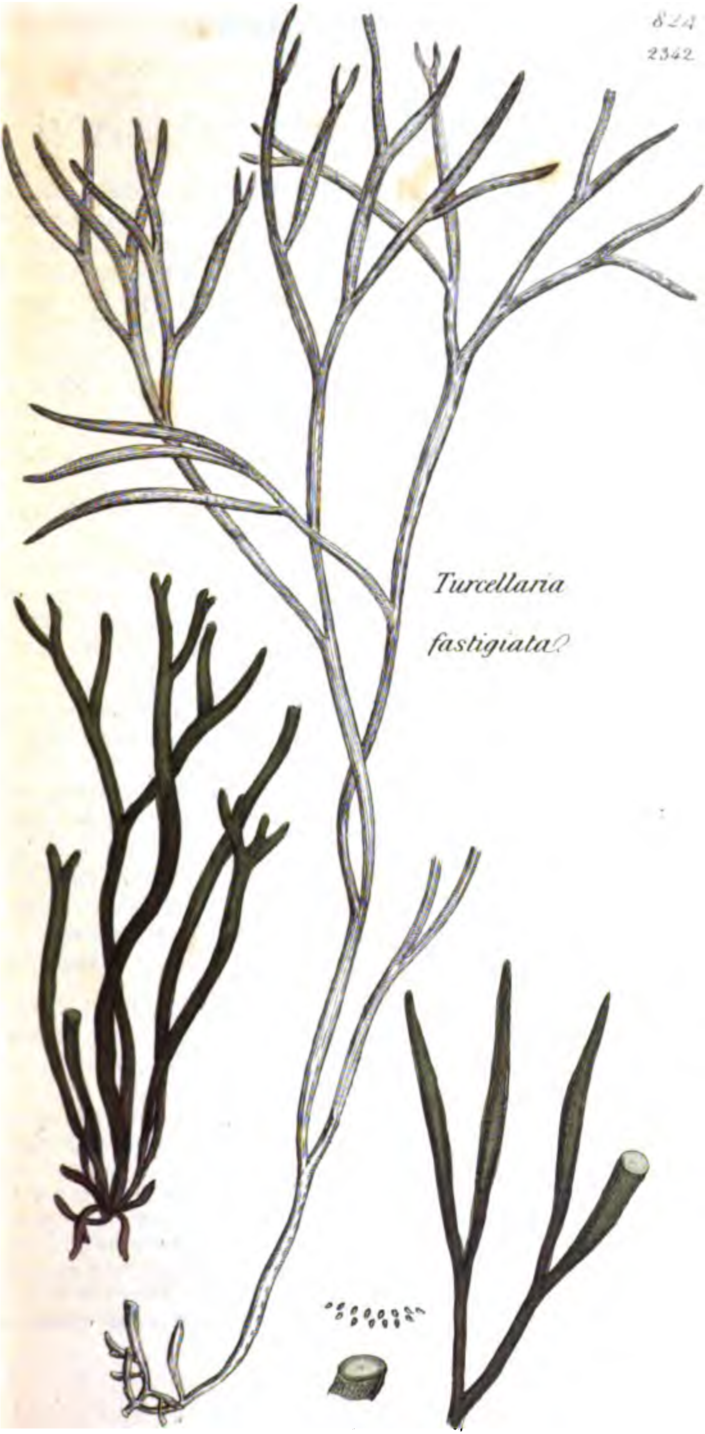
824
2342



Turcellaria fastigiata

TRIBE VII. FURCELLARIEÆ.

Marine plants, of a dull dark purplish or brownish-red colour, changing to black on exposure to the air. Substance cartilaginous. Structure cellular, with a dense coloured stratum of horizontal filaments forming the circumference. Base creeping. Frond cylindrical, filiform, dichotomous. Fructification terminal, composed of pod-like, indehiscent receptacles, within which is imbedded, near the circumference, a horizontal circular stratum of dark brown, oblong, pyriform sporules.

GENUS DCXXVII. FURCELLARIA. *Furcellaria.*

GEN. CHAR. *Frond* cartilaginous, cylindrical, filiform, dichotomous. *Fructification*; terminal, elongated, pod-like receptacles, containing a stratum of dark, oblong-pyriform sporules in the circumference.

This genus, the only one of its tribe, and consisting of a single species, was judiciously segregated by Dr. Greville from the fucoid series, differing as it does in structure and fructification.

The sporules have not the limbus or pellucid covering, so strikingly characteristic of those of *Fucoideæ* and *Dictyoteæ*; a negative indication that the genus is a grade lower in the scale of organization than those of the two tribes in question. The name seems to be derived from the Latin *furcula, a little fork*, in allusion to the dichotomous or forked extremities of the branches.

FURCELLARIA FASTIGIATA. *Fastigiated Furcellaria.* TAB. **2342.**

Fucus lumbricalis, *Gmelin.* *E. B.* 824. *Turner Hist. Fuc. tab.* 6. Furcellaria fastigiata, *Lamouroux.* *Greville Alg. Brit.* 67. *tab.* 11. *Agardh Spec. Alg.* 1. 103. Fucus fastigiatus, *Hudson.* F. furcellatus? *Linnæus.*

Very frequent on all our rocky coasts. From the base of the frond, which is fixed by a small callous dilatation to the rocks or stones, several pale purple or pinkish fibres are thrown out, furnished with callosities which attach themselves in a similar manner, and eventually produce young plants. Fronds tufted, dark brown or purplish, three to nine inches high, about the thickness of a crow-quill, cylindrical, many times dichotomous: the branches fastigiate, forming acute angles at their divarications; when fertile, terminating in a pair of cylindrical, pointed receptacles, about twice their own thickness in maturity and one to two inches in length. Fructification during the winter. Perennial.

In drying it becomes black and brittle, and does not adhere to paper.

A variety, *β*. of Mr. Turner, has the extremities of the branches compressed, pale, soft, and transparent for the length of a quarter of an inch or more; these parts are generally deciduous, but sometimes, according to Dr. Greville, elongate and become healthy branches. They appear to be abortive fructification: but both of the botanists above mentioned incline to consider them as connected in some way or other with the true one; an opinion, however, at variance with all that we know respecting the reproductive functions of the lower orders of plants, among which, so far as observation has extended, no parallel has hitherto been discovered to those of the flowering vegetable.

TRIBE VIII. SPONGIOCARPEÆ.

Marine plants, of a dull dark reddish-purple colour, changing to nearly black on exposure to the air; of a cartilaginous substance and cellular structure. Base scutate. Frond filiform, cylindrical and dichotomous. Fructification uniform, consisting of naked spongy warts, composed of a mass of radiating filaments, among which are imbedded numerous roundish clusters of sporules, surrounded by a pellucid border; the sporules wedge-shaped, fixed by their base to a central point.

This, like *Furcellarieæ*, consists but of a single genus and species, equally isolated from the rest of the Algæ, especially by its fructification. In general aspect the two plants so nearly accord that it is difficult to determine them in the barren state, unless by reference to the fibrous or scutate character of their base, and by the divarications of the branches being acute in *Furcellaria*, while in *Polyides* they are always more or less obtuse: no two species however can possibly be more distinct in fructification.

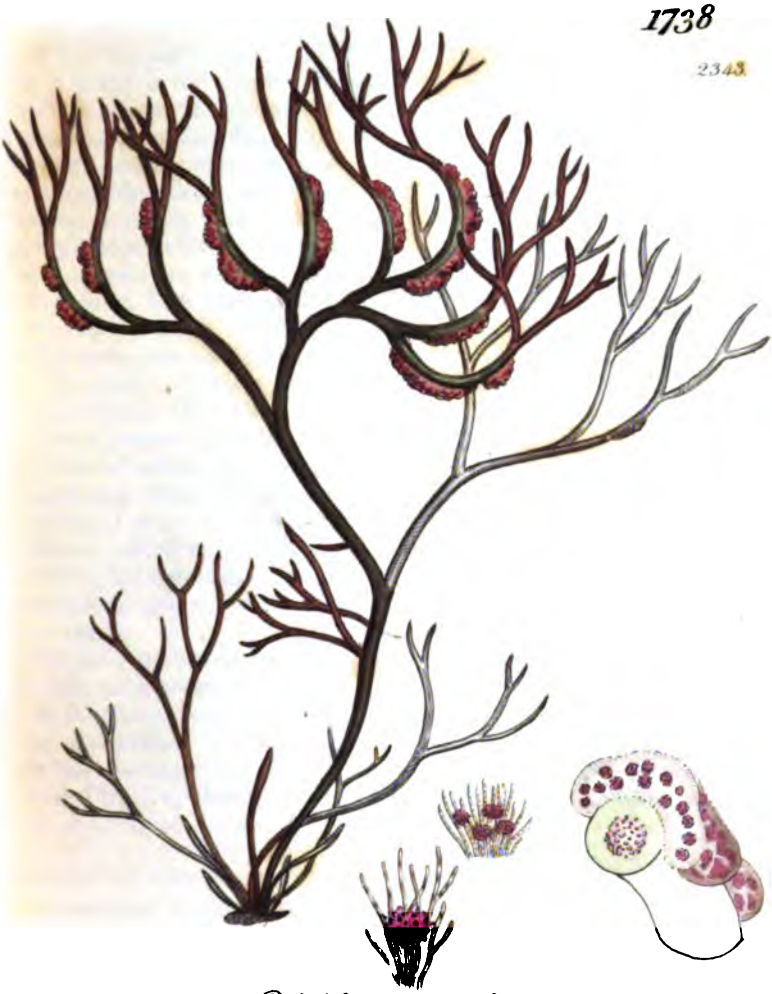
GENUS DCXXVIII. POLYIDES. *Polyides.*

GEN. CHAR. *Frond* cartilaginous, filiform, cylindrical. *Fructification*; naked, spongy warts, composed of radiating filaments, among which are imbedded roundish clusters of wedge-shaped sporules invested by a pellucid border.

The principal distinguishing character of this genus is its

1738

2343



Polyides rotundas.

May 1.1807. Publish'd by Ja.s Sowerby, London.

very peculiar fructification. Dr. Greville remarks: "When carefully examined by the aid of the microscope, the internal structure of the frond is perceived to be cellular; but the cellules are elongated and arranged in such a manner as to have the appearance of filaments, especially in the centre and towards the circumference. Many are constantly inclining in a curve towards the circumference, where they terminate, and constitute a dense coloured stratum. During the development of the fructification these filaments are prolonged, become branched, and produce here and there on the frond spongy masses, within which are roundish clusters of wedge-shaped sporules, fixed by their base to a central point. In sterile plants globular white masses are freely deposited in the cellular tissue towards the circumference of the frond, and are easily broken down into minute spherical grains." Besides these, which are the most frequent states of the plant, Sir W. J. Hooker mentions specimens communicated by Mrs. Griffiths from Sidmouth, "with rather long, swollen branches, containing beneath the apices an immense quantity of globular, extremely minute sporules, of a pale purplish colour, amongst the fibres of which the substance is composed." This latter I have never observed, but from description it would appear to be one of those morbid states of development of the fructification to which most of the cellular plants are prone under peculiar circumstances. The normal state of the reproductive apparatus is shown in the magnified figures on our plate of *P. rotundus.*

The name bestowed by Agardh, from the Greek *πολὺ*, *many*, and *ἰδέα*, *form* or *appearance*, referring perhaps to the diversity in the thickness, size and furcation of the frond, and its different appearance in the presence or absence of fructification, is far less characteristic of the plant than that of *Spongiocarpus*, bestowed by Dr. Greville, from *σπογγία*, *sponge*, and *καρπὸς*, *fruit*, alluding to the spongy warts of fructification.

POLYIDES ROTUNDUS. *Cylindrical Polyides.* TAB. **2343.**

Fucus rotundus, *Gmelin.* *E. B.* 1738. *Turner Hist. Fuc. tab.* 5. Polyides rotundus, *Greville Alg. Brit.* 70. *tab.* 11. *Hooker Crypt. Part* 1.284. P. lumbricalis, *Agardh Spec. Alg.* 1. 192. Spongiocarpus rotundus, *Greville Fl. Edin.* 286. Furcellaria rotunda, *Lyngbye.* Fucus radiatus, *Goodenough and Woodward in Linn. Trans.* 3. 202. Gigartina rotunda, *Lamouroux.*

Only less common on the southern and eastern shores of England than *Furcellaria fastigiata*, but apparently rare elsewhere. Base, an expanded, leather-like disc, bearing numerous fronds, various in height, purplish-brown, cylindrical, repeatedly dichotomous, the divarications more or less obtuse-angled, the ultimate branches acute and nearly level-topped. Fructification mostly unilateral on the upper branches, consisting of superficial, pale or pinkish, wart-like excrescences, at first roundish, eventually elongating, and often becoming confluent; globular masses of sporules, scattered irregularly among the articulated filaments forming the substance of the warts, red, invested by a pellucid case*; the individual sporules pear-shaped or wedge-shaped, fixed by their narrow bases to a central point.

Becomes of a horny substance when dry, and does not adhere to paper. Perennial. Fructification in the winter.

This species seems to be very widely distributed, unless *P. Durvillæi*, mentioned by M. Bory de St. Vincent as occurring on the coasts of Chili and Tahiti, be really distinct, which his description scarcely warrants. I have two small specimens, received in a basket of shells from the Indian Ocean, not in fructification, but differing in no respect from our species, unless as being rather more slender and divaricated than it is usually seen here.

TRIBE IX. FLORIDEÆ.

Marine plants, of a purplish, reddish or fine rose-colour, seldom changing much by exposure to the air; of a cartilaginous, coriaceous or membranaceous substance and cellular texture, often reticulated. Frond flat, or compressed, or cylindrical, with or without a midrib, sometimes furnished with distinct leaves or foliaceous expansions. Fructification often of two kinds; the first spherical or hemispherical thecæ, sessile or stalked, and containing a round mass of sporules; the second composed of granules, mostly ternate, scattered or collected into little spots or lines, and situated either in the general substance of the frond or in little leaflets, or distinct pod-like foliaceous processes. More than one kind of fructification is never found upon the same individual.

The most extensive, varied and beautiful of all the tribes of the compound or inarticulated Algæ, containing upwards of two hundred known species, chiefly distributed in the seas of the temperate zones. Their structure is more lax and more distinctly cellular than that of any of the preceding tribes, some of the *Dictyoteæ* excepted, but it is at the same time more simple, and the fructification, though infinitely varied in disposition and development in the different genera, is upon the whole less complicated.

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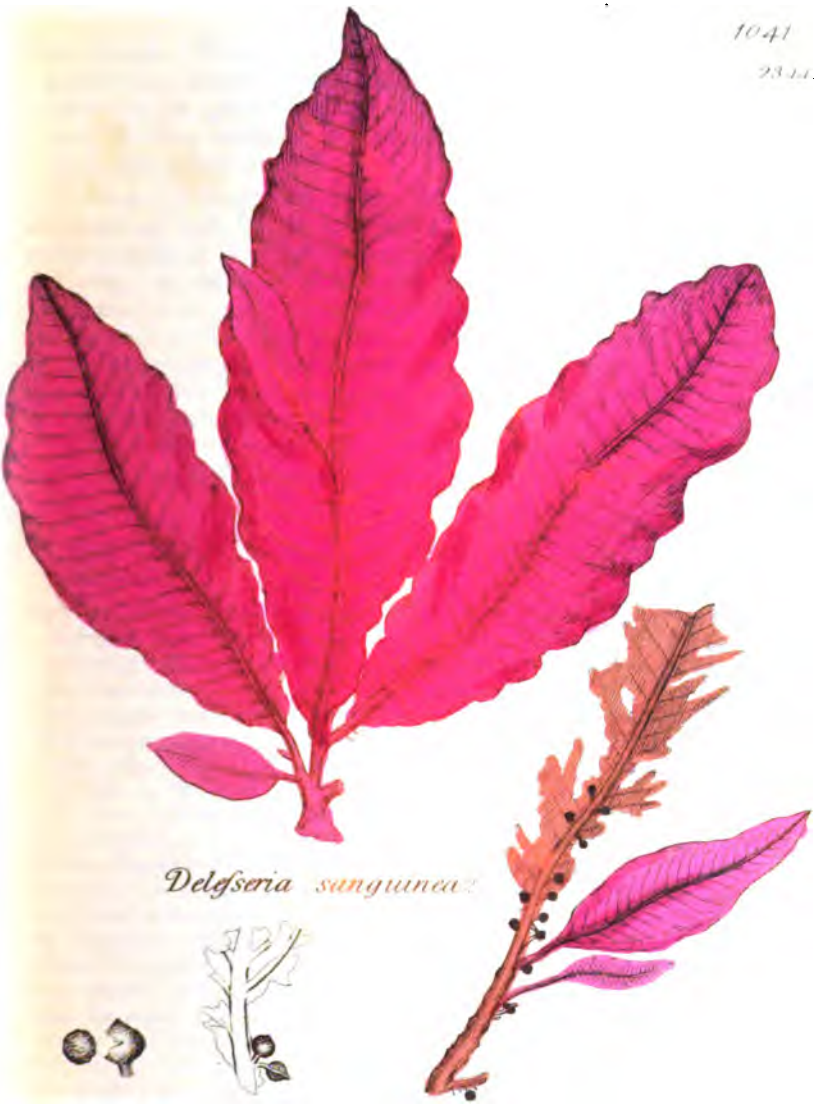
* This case is described by Dr. Greville as a border or limbus, but it completely invests the globular masses of sporules previous to maturity, and is probably a modification of a vesicle, as the sporules are of its endochrome.

1041

2344.



Deleſseria sanguinea?

July 1. 1802. Published by Jaˢ Sowerby, London.

GENUS DCXXIX. DELESSERIA. *Delesseria.*

GEN. CHAR. *Frond* rose-red, flat, membranaceous, with a percurrent midrib. *Fructification* of two kinds: thecæ containing a globular mass of sporules; and ternate granules forming definite sori in the frond, or in distinct foliaceous appendages.

About a dozen known species belong to this genus: they are plants of very fragile texture, rarely found entire, unless growing in rocky pools or drawn up in nets from deep water; in drying they adhere but imperfectly to paper, and their brilliant carmine or rose-colour is less altered by the process than are the hues of the Algæ generally. Most of the more delicate species are epiphytic; the larger grow attached to rocks and stones, but often likewise on the stems of *Fuci* and *Laminariæ*. It is doubtful whether any of them are perennial.

Lamouroux, the author of the genus, named it in honour of Baron Benjamin Delessert, a celebrated French patron of botany.

DELESSERIA SANGUINEA. *Red Dock-leaved Delesseria.* TAB. **2344.**

Stem cylindrical, branched, bearing oblong or ovate, waved, entire, midribed, transversely veined leaves. Fructification; spherical, pedunculated thecæ growing on the midrib, or scattered in oblong leafy processes.

Fucus sanguineus, *Linn.* *E. B.* 1041. *Turner Hist. Fuc. tab.* 36. Delesseria sanguinea, *Lamouroux. Greville Alg. Brit.* 72. *Agardh Spec. Alg.* 1. 172. *Hooker Crypt. Part* 1. 285. Wormskioldia sanguinea, *Sprengel.*

Frequent on submarine rocks, as well as cast up on the beach in rough weather, but in the latter case rarely entire, on account of the extreme fragility of the membranaceous part of the frond. The short branched stem is fixed by a small red disc; the leaves vary in length from three to twelve inches, and from one to four in breadth; they are elliptical or oblong, subacute or obtuse at the apex, waved and plaited, but quite entire at the margin, with a strong midrib and many parallel lateral veins. Fructification not obvious at the time when the plant is in perfection, but forming on the cartilaginous midrib after nearly all the rest of the frond has fallen away; either globular or subovate thecæ supported on stalks, or ternate granules imbedded in the substance of small stalked leaflets; the two states never observed upon the same individual. At most only biennial, the battered stalks and midribs only remaining over the first season, and bearing fructification in the spring.

When perfect it is scarcely equalled in brilliancy of hue by any vegetable production, the membranaceous part of the frond being of a vivid and glossy rose-pink, the midrib and veins of a deep carmine-red. It is however very frequently completely encrusted by *Flustra dentata* and other crustaceous zoophytes.

β. latifolia; leaves cordate, lobed and plaited. Found at Appin by Captain Carmichael. "A singular and beautiful state of this plant with leaves four inches in diameter and hardly more in length, obtusely lobed and plaited."—*Carm. in Hooker.*

DELESSERIA sinuosa. *Red Oak-leaved Delesseria.* TAB. **2345**.

Stem cylindrical. Frond at first simple, eventually pinnated with oblong, dentato-sinuate or pinnatifid, transversely veined, crenated leaves, ciliated at the margins with sporule-bearing leaflets.

Fucus sinuosus, *Goodenough and Woodward in Linn. Trans. E. B.* 822. *Turner Hist. Fuc. tab.* 35. Delesseria sinuosa, *Lamouroux. Greville Alg. Brit.* 73. *Hooker Crypt. Part* 1. 285. *Agardh Spec. Alg.* 1. 174. Wormskioldia sinuosa, *Sprengel.* Fucus rubens, *Hudson. Stackhouse.*

More frequent on all our sea-coasts than *D. sanguinea.* Generally epiphytic on the stems and basal fibres of *Laminaria digitata* and *L. bulbosa.* Whole plant of a uniform red, less brilliant and darker than that of the preceding species. Stem fixed by a minute blackish disc, terminating at first in a simple, leaf-like frond, from two to four inches in length and nearly as much in breadth, deeply sinuated and dentated, eventually pinnatifid, sometimes twice so or even more, the segments mostly opposite, all furnished with a central rib and lateral transverse veins. The whole margin in some specimens is beautifully fringed with minute, oblong or linear leaflets, and similar ones are occasionally seen on the midrib and veins. The fructification is of two kinds; spherical thecæ imbedded in the substance of the frond, or ternate granules, occupying the minute ciliary processes by which it is fringed. Probably biennial, producing its fructification in the second autumn. It scarcely adheres to paper in drying.

In old and luxuriant specimens the frond is much more divided than here figured, and even often pinnate.

DELESSERIA alata. *Winged Delesseria.* TAB. **2346**.

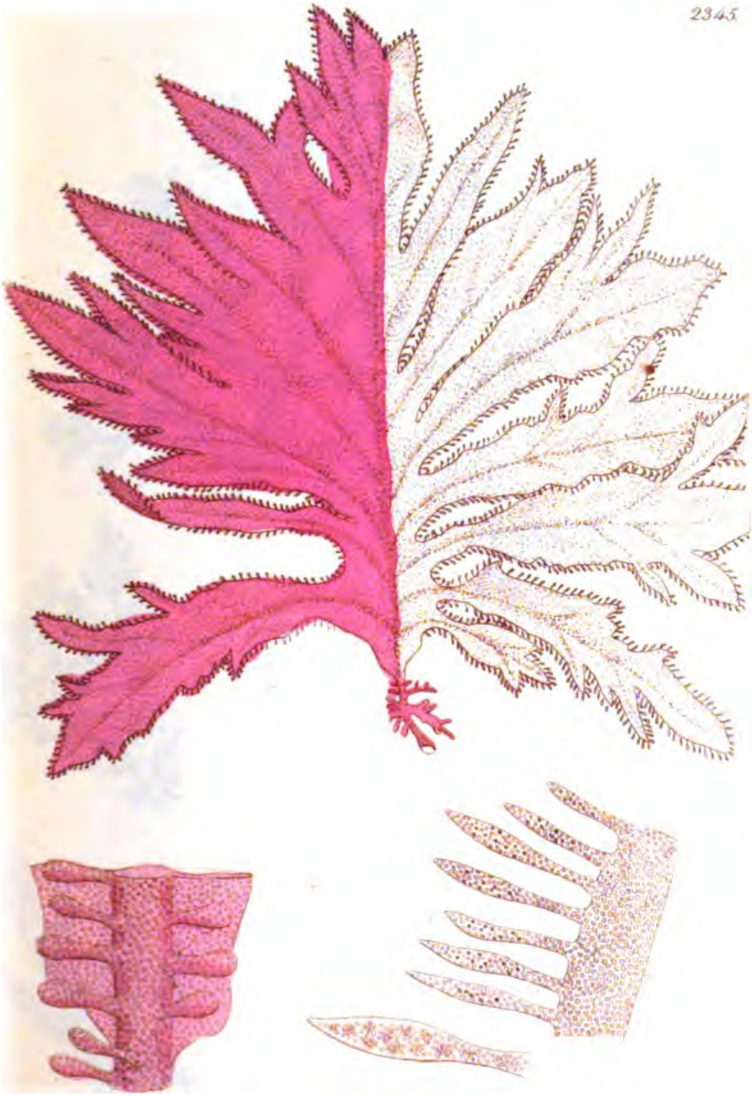
Frond linear, subdichotomous, much divided in a subpinnatifid manner; the segments linear. Fructification mostly in lanceolate leaflets at the apices of the segments or springing from the midrib.

Fucus alatus, *Linn. E. B.* 1837. *Turner Hist. Fuc. tab.* 160. Delesseria alata, *Lamouroux. Greville Alg. Brit.* 73. *Hooker Crypt. Part* 1. 285. *Agardh Spec. Alg.* 1. 178. Wormskioldia alata, *Sprengel.*

Frequent; generally attached to the fronds of the larger species of *Fucus* and *Laminaria.* Fronds three to six inches long, growing many together from a small blackish disc; the main divisions dichotomous, the subsequent ones alternately pinnatifid: the colour rose-red or various shades of crimson; the midrib very distinct and darker; the membranaceous border very thin, almost transparent. Fructification

822.

2345.



Deleſseria sinuosa?

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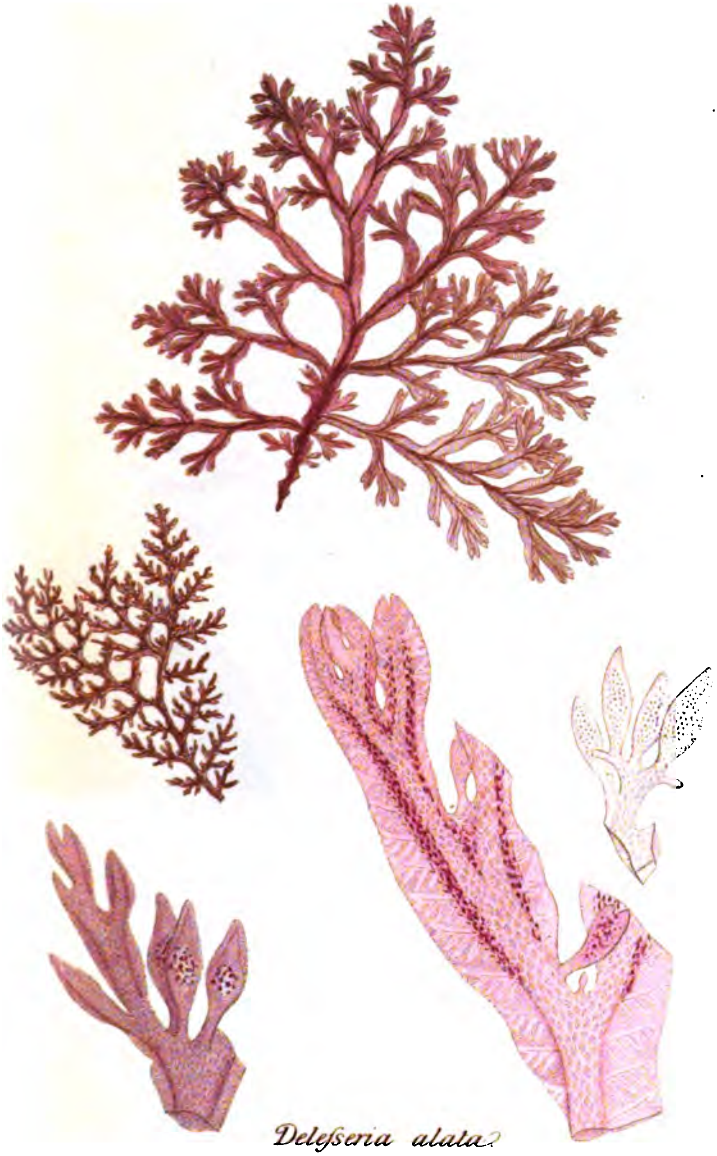
1837

2346.

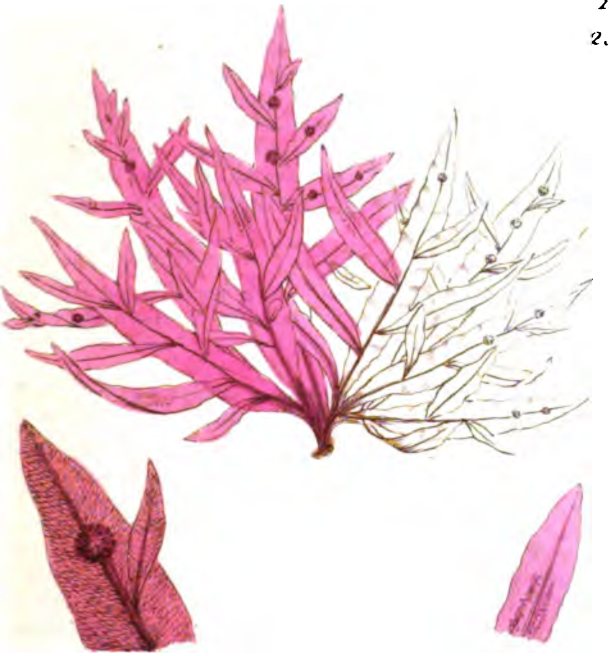


Deleſseria alata.

Jan. 1. 1808. Published by Ja.s Sowerby London.

1396

2347.



Deleſseria Hypogloſsum.

Decr. 1. 1804 Publiſhed by Jas. Sowerby. London.

various: sometimes minute, sessile, spherical thecæ attached to the midrib or to the extremities of the branches; sometimes minute lanceolate leaflets, arising from the midrib or apex of the segment, and containing a mass of articulated filaments, the uppermost vesicle of which is swollen, its endochrome apparently forming a red obovate sporule, or occasionally separating into two: in other cases minute ternate granules occupy the substance of similar leaflets or are imbedded in that of the frond itself. Biennial, or perhaps perennial, producing its fructification in the summer and autumn. It adheres pretty firmly to paper in drying, and scarcely changes its colour.

The membranaceous part of the frond varies much in width; our upper figure represents the more common size, in which, by means of a magnifier, as shown below, a very delicate transverse venation is visible. Dr. Greville mentions specimens, collected by Mr. Drummond on the Irish coast, in which the larger segments of the frond were half an inch wide, and the transverse veins visible to the naked eye. In contrast to these, specimens are very frequently met with, on some parts of our coast, in which the whole plant consists of midrib, the membranaceous border being altogether wanting; this is the variety

β. angustissima of *Turner, Hist. Fuc. tab.* 160.*f—k*,

a form that would scarcely be recognized as belonging to the same species, unless by reference to the peculiar mode of branching, and the occasional occurrence of intermediate specimens.

DELESSERIA HYPOGLOSSUM. *Proliferous Delesseria. Acute Ruscus-like Delesseria.* TAB. **2347**.

Frond linear-lanceolate, acute, repeatedly proliferous from the midrib with leaves of the same form: oblique, lateral veins indistinct, simple. Fructification; spherical thecæ on the midrib of the lesser leaves, or sori of ternate granules near their extremity.

Fucus Hypoglossum, *Woodward in Linn. Trans. E. B.* 1396. *Turner Hist. Fuc. tab.* 14. Delesseria Hypoglossum, *Agardh Spec. Alg.* 1. 176. *Greville Alg. Brit.* 75. *tab.* 12. *Hooker Crypt. Part* I. 286. Wormskioldia Hypoglossum, *Sprengel.*

Not uncommon on rocks, and epiphytic on the larger Algæ. Fronds several together, springing from a minute scutate base, two to six inches or more in length, varying greatly in width, membranaceous, very thin, bright rose-colour; repeatedly proliferous from the midrib; the divisions or ramifications all simple, linear-lanceolate, entire, acute at the apex, attenuated below, and veined throughout with obscure, pellucid, simple lines, passing obliquely upwards from the midrib to the margin. Fructification: on some plants, spherical thecæ sessile on the midrib, containing numerous pyriform sporules; on others, ternate granules, forming linear-oblong sori on each side of the midrib, and, as well as the thecæ, always occurring on the younger or last developed leaves. Annual. Fructification in the latter part of the summer and autumn.

Under the microscope the frond is beautifully reticulated, and the indistinct transverse veins are seen, with a high power, to consist of minute elongated vesicles placed in a single moniliform series.

DELESSERIA RUSCIFOLIA. *Blunt Ruscus-like Delesseria.* TAB. **2348.**

Frond linear-oblong, repeatedly proliferous from the midrib with leaves of the same form: oblique lateral veins distinct, branched.

Fucus ruscifolius, *Turner in Linn. Trans. Hist. Fuc. tab.* 15. *E. B.* 1395. Delesseria ruscifolia, *Lamouroux. Greville Alg. Brit.* 76. *Hooker Crypt. Part* 1. 286. *Agardh Spec. Alg.* 1. 174. Wormskioldia ruscifolia, *Sprengel.*

Occasionally met with on rocks and on the larger species of Algæ, chiefly on the southern and eastern coasts of England, but comparatively rare. In habit very much resembling the last species, but differing in the ramifications being uniformly oblong and rounded at the extremities, and the moniliform lateral veins very distinct and branched, as shown in our lower figure. In fructification it seems to agree with *D. Hypoglossum.* The substance of the frond is somewhat firmer than that of the latter species, and Dr. Greville remarks that its reticulations are much smaller and the cellules of a rounder figure. Comparison of the specimens of both within my reach leave me, however, much in doubt whether they are other than mere varieties, the alleged distinctions not being always so obvious as could be desired between separate species.

GENUS DCXXX. NITOPHYLLUM. *Nitophyllum.*

GEN. CHAR. *Frond* plane, delicately membranaceous, rose-coloured, reticulated, without veins. *Fructification*; hemispherical thecæ imbedded in the substance of the frond, or ternate granules forming distinct scattered spots.

Generally with more or less distinct traces of veins about the base of the frond, seen under the microscope to be composed of vesicles more elongated than the rest, but never so concentrated as to form a midrib or continued axis of growth, as in the preceding genus; hence the outline of the frond is much more irregular. Dr. Greville separated the species from *Delesseria*, from which they differ besides in their usually more delicate texture, and somewhat in fructification. The name, from the Latin *niteo, to shine*, and the Greek *φύλλον, a leaf*, characteristic of the glossy or varnish-like surface of these plants, is not agreeable to classical orthodoxy, or to the canons laid down by Linnæus for the construction of generic names.

The species, about six in number as at present known, are annual, and generally epiphytic: they adhere to paper in dry-

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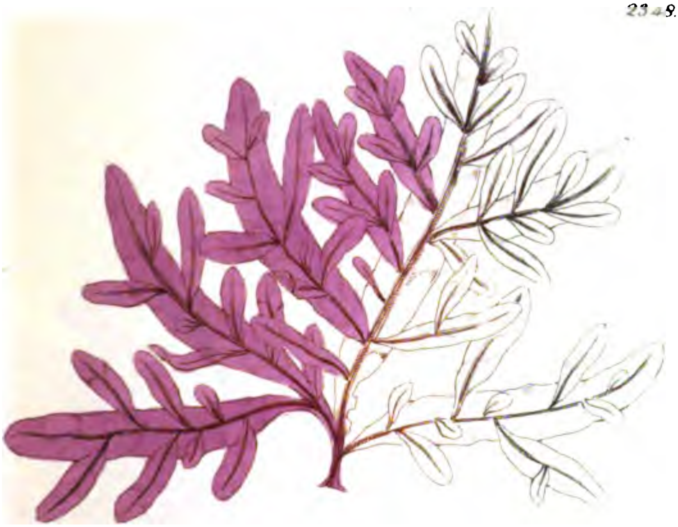
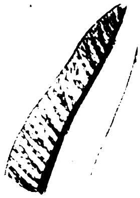
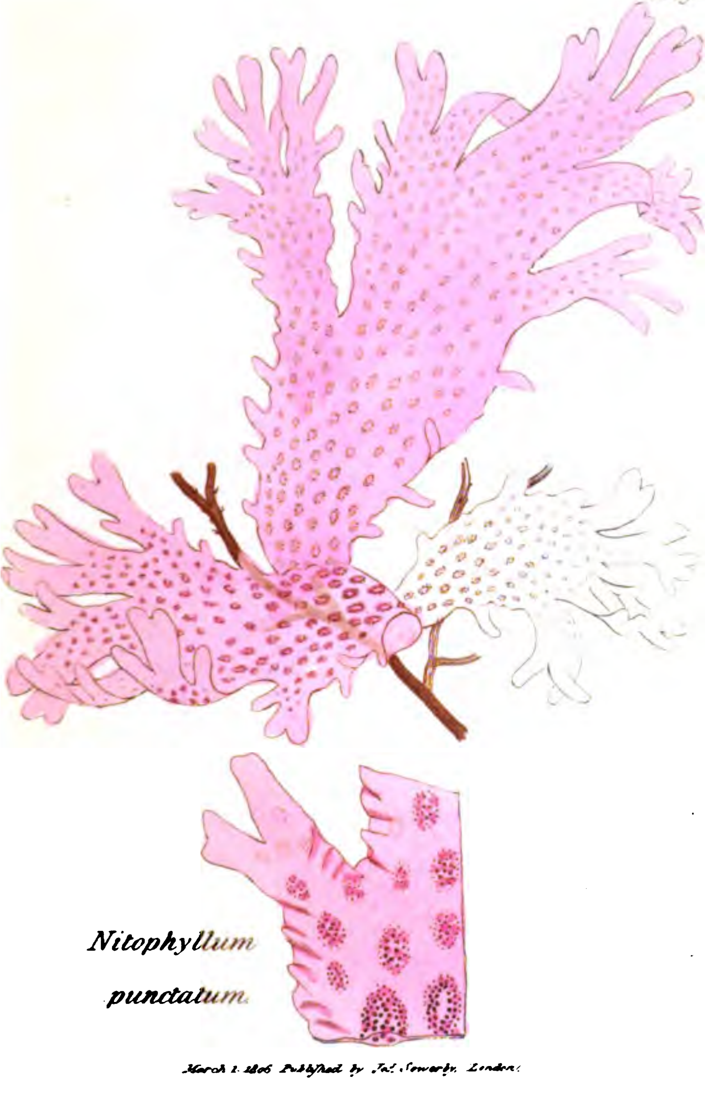


Delesseria
ruscifolia.



Nov.r 1 1804 Published by Ja.s Sowerby. London.



Nitophyllum punctatum.

March 1. 1806 Published by Jas. Sowerby, London.

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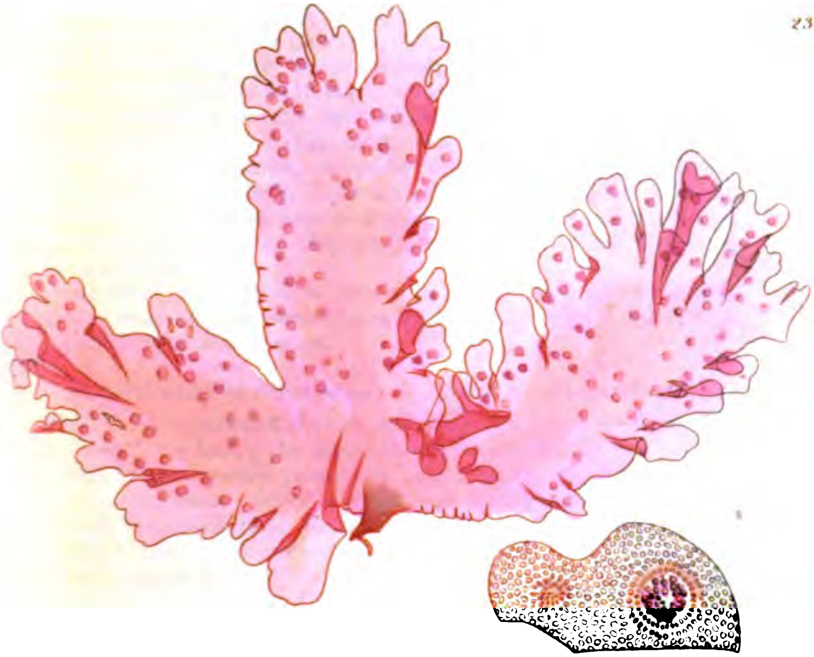

Nitophyllum ulvoideum?

[illegible] published by J^s. Sowerby London.

ing, losing but little of their original colour, unless by exposure to the sun.

NITOPHYLLUM punctatum. *Dotted Nitophyllum.* Tab. 2349.

Frond very thin, destitute of veins in every part, vaguely cleft for half its length or more into segments, which become narrower as they subdivide. Spots of granules scattered over every part of the frond.

Fucus punctatus, *Withering.* *E. B.* 1573. Nitophyllum punctatum, *Greville Alg. Brit.* 79. *tab.* 12. *Hooker Crypt. Part* 1. 287. Delesseria punctata, *Agardh Spec. Alg.* 1. 186. Wormskioldia punctata, *Sprengel.* Ulva punctata, *Stackhouse.*

Epiphytic on many of the larger Algæ, on various parts of the coast both of Great Britain and Ireland. Fronds single or several together, springing from a minute disc, subpalmate, three to six inches in length and from three to four in breadth, deeply divided into about three diverging segments, repeatedly subdivided, all the lobes linear and terminating obtusely. Fructification; either hemispherical thecæ, as large as turnip-seed, scattered over the frond, or elliptic-oblong sori of ternate granules. Annual. Perfecting about the latter end of the summer.

Substance, when dried, so thin as to appear like a coating of pale pink or rose-coloured varnish upon the paper, beautifully dotted with a deep crimson fructification.

NITOPHYLLUM ocellatum. *Ocellated Nitophyllum.*

"Frond with a roundish outline, extremely thin, quite veinless, cleft almost to the base; the segments repeatedly divided in a manner more or less between palmate and dichotomous, mostly linear, obtuse at the ends. Spots of granules in the segments."—*Greville.*

Nitophyllum ocellatum, *Greville Alg. Brit.* 78. *Hooker Crypt. Part* 1. 286. Wormskioldia ocellata, *Sprengel.* Delesseria ocellata, *Greville Crypt. Fl. tab.* 347. *Agardh Spec. Alg.* 1. 187. Fucus ocellatus et granateus, *Lamouroux Diss.*

Found in similar habitats to the last, and probably not distinct as a species; the only positive difference consisting in the disposition of the granular sori in the segments, instead of their being dispersed over the frond.

NITOPHYLLUM ulvoideum. *Ulva-like Nitophyllum.* Tab. 2350.

Frond membranaceous, thickish, veinless, of an irregular roundish outline, vaguely and deeply cleft into oblong, broadish segments, rounded at the extremity. Spots of granules small, scattered over nearly the whole of the frond.

Fucus ulvoides, *Turner Hist. Fuc. tab.* 80. *E. B.* 2134. Nitophyllum ulvoideum, *Hooker Crypt. Part* 1. 287. Delesseria ulvoides, *Hooker Fl. Scot.* D. Hilliæ, *Greville Crypt. Fl.* 351. Nitophyllum Hilliæ, *Grev. Alg. Brit.* 80.

Far less frequent than *N. punctatum,* but occasionally cast on shore on various parts of the coast, either torn from the rocks or attached to the fronds of *Fuci*, *Furcellaria*, and others of the coarser Algæ. Frond three to eight inches long and nearly as broad, cleft into three or more irregular segments, which are generally more or less cloven and waved on the margin. Fructification nearly the same as in *N. punctatum*; from which its thicker texture, in the recent state, chiefly distinguishes it. Colour a deep rose-red, changing by age to a yellowish or greenish tint. Annual. Fructifying in the end of the summer.

NITOPHYLLUM GMELINI. *Marginal-fruited Nitophyllum.* TAB. **2351.**

Stem short, passing into a frond with a roundish outline deeply cleft; the main segments broadly wedge-shaped, vaguely subdivided, faintly marked with vague flexuose veins; the margin entire. Sori of ternate granules irregular, marginal.

Nitophyllum Gmelini, *Greville Alg. Brit.* 82. *Hooker Crypt. Part* 1. 288. *Hooker in E. B. Supp.* 2779. Delesseria Gmelini, *Lamouroux.* Fucus laceratus, γ, *Turner Hist. Fuc.* 1. 153.

Frond shortly stipitate, rarely more than two or three inches in height, springing from a minute scutate base; nearly orbicular or semicircular in its general outline, deeply cloven into three or more large, flabelliform or wedge-shaped segments, which are again variously and irregularly divided into very obtuse, linear or wedge-shaped lobes; obscurely veined from the base to the margin. Fructification, either minute, dark red, hemispherical thecæ, remotely scattered over the reticulated surface of the frond; or ternate granules, forming irregular, often confluent sori or spots a little within the margin of the ultimate segments. Annual. Fructifying in the latter end of the summer.

A very beautiful species, of a deep, somewhat purplish rose-colour and very thin substance, apparently, but I have not seen recent specimens: not adhering to paper in drying. Some of my specimens from the North of Ireland, near the Giants' Causeway, seem to come very near indeed to *N. laceratum*, even in the fructification, though others correspond exactly with the Devonshire ones. Are the plants really distinct? I believe them so; but the species of *Nitophyllum* are very difficult to define. Our upper figure, representing a specimen gathered by Mr. Borrer on Seaford-beach, Sir W. J. Hooker considers as belonging to *N. laceratum*, which is undoubtedly a very variable plant.

NITOPHYLLUM BONNEMAISONI. *Discoid Nitophyllum.*

Frond shortly stipitate, extremely thin, vaguely cleft, the segments roundish wedge-shaped; the stem vanishing at the base of the frond in a few obscure veins. Fructification scattered over the frond.

Nitophyllum Bonnemaisoni, *Greville Alg. Brit.* 81. *Hooker Crypt. Part* 1. 287. Delesseria Bonnemaisoni, *Agardh Spec. Alg.* 1. 186. *Greville Crypt. Fl. tab.* 322. (*fig.* 2 *and* 3 *excl.*)

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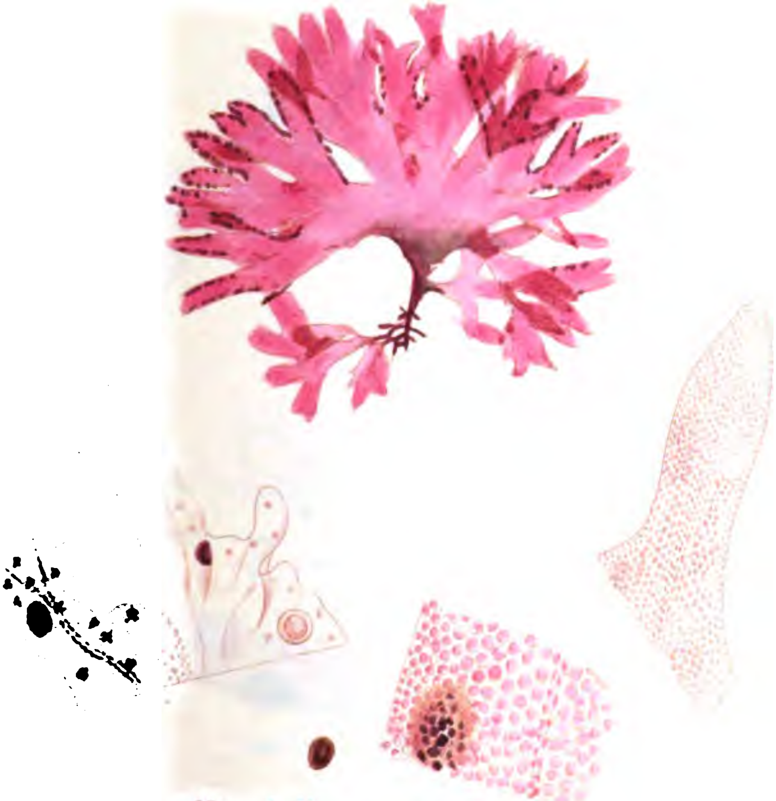

Nitophyllum Gmelini.

October 1st 1853.

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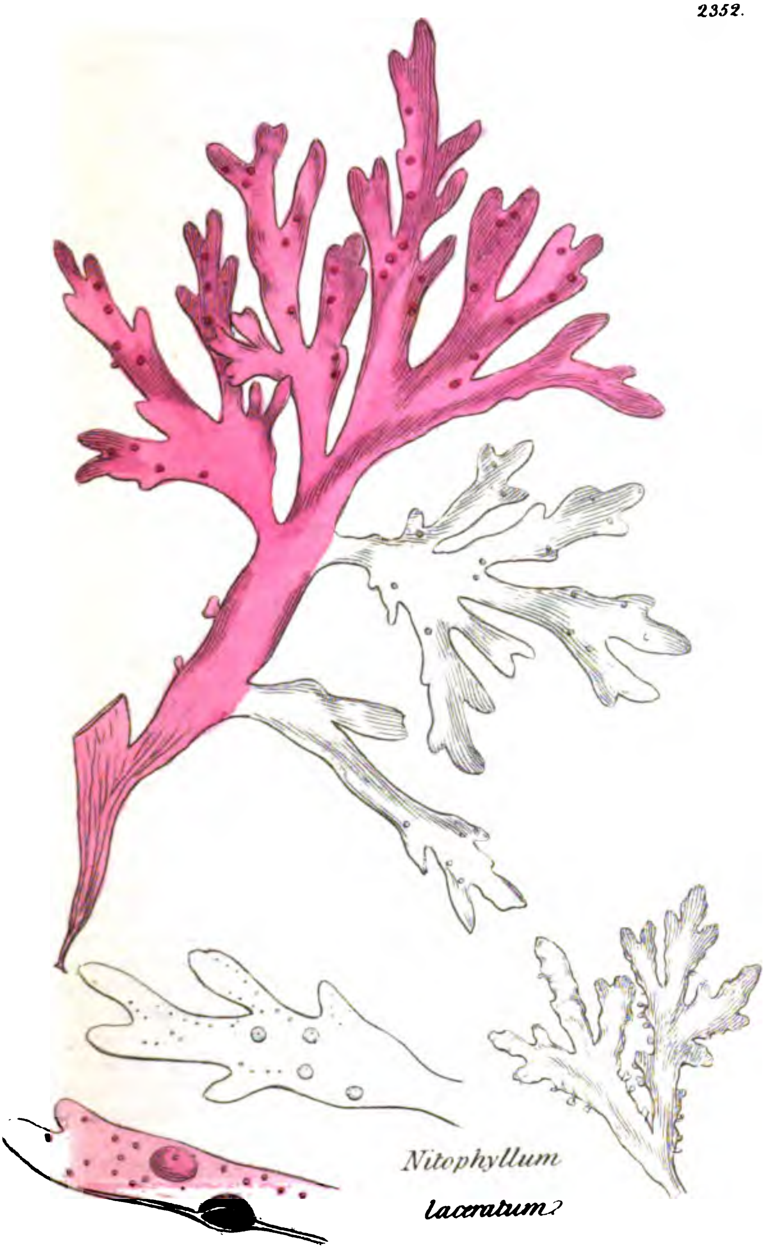
2352.



Nitophyllum

laceratum?

Septr. 1.1802. Publiſhed by Jas. Sowerby: London.

"Stem slender, expanding into a semicircular or roundish wedge-shaped frond, two to four inches in length, and two to five in width, irregularly cleft into roundish wedge-shaped segments. At the base of the frond are a few veins, produced by the disappearance of the stem. Fructification scattered over the frond: thecæ small: spots of ternate granules oval. Substance extremely thin, delicate and membranaceous, adhering to paper in drying, easily lacerated. Colour a most beautiful rose-pink, which changes to purplish in drying." —*Greville.*

Found on the shores of the Orkney and Western Islands, and of the North of Ireland. Annual. Fructification in the summer.

This seems to be only distinguishable from *N. Gmelini* and *N. laceratum* by its scattered instead of marginal fructification.

NITOPHYLLUM LACERATUM. *Lacerated Nitophyllum.* TAB. **2352.**

Frond very thin, dichotomously or vaguely divided; segments sublinear, obtuse, obscurely veined; margin lacinulated, fringed or waved. Sori of ternate granules marginal.

Fucus laceratus, *Gmelin. E. B.* 1067. *Turner Hist. Fuc. tab.* 68. Nitophyllum laceratum, *Greville Alg. Brit.* 83. *Hooker Crypt. Part* 1. 288. Delesseria lacerata, *Agardh Spec. Alg.* 1. 184. Wormskioldia lacerata, *Sprengel.* Chondrus laceratus, *Lyngbye.* Fucus crispatus, *Hudson.* F. endivifolius, *Lightfoot.*

Very common on all our rocky coasts, generally attached to the larger *Fuci* and *Laminariæ*. Fronds springing singly or several together from a minute discoid base, two inches to a span in length, variously and deeply divided in a dichotomous or subpalmate manner; the segments more or less linear, the ultimate ones terminating obtusely; the margins entire or minutely laciniated, variously waved and curled. Fructification, either hemispherical, dark red, mostly marginal thecæ; or ternate granules, forming roundish marginal sori.

The whole plant is in general very thin and delicate, of a pale pinkish-red varying to brownish, and adheres but slightly to paper in drying. It is, as first remarked by Mr. Turner, very prone to fix itself by the edges, especially when young, and creep along the rocks or any plants that lie in its way. Apparently annual, perfecting its fructification in the autumn.

The lower part of the frond is always more or less distinctly marked with parallel, interbranching, dark veins, originating at the base, and generally vanishing at the length of two or three inches, but sometimes extending even into the branches.

An exceedingly variable species in regard to the breadth and lacerations of the frond. The fructification, especially the thecæ, is not always marginal.

GENUS DCXXXI. RHODOMENIA. *Rhodomenia.*

GEN. CHAR. *Frond* plane, membranaceous, fine pink or red, quite veinless, sessile, or with a short stem, which expands immediately into the frond. *Fructification*, hemispherical, scattered thecæ; or ternate granules, spreading over the whole or some part of the frond (*not in defined spots or sori*).

Fifteen or sixteen species, variously referred by preceding algologists, constitute this genus of Dr. Greville's 'Algæ Britannicæ.' The hemispherical thecæ, he remarks, resemble those of the last genus, but the ternate granules are not disposed in definite sori, and mostly too small to be detected without a magnifier. The substance of the frond is generally more densely cellular, and less remarkably reticulated than that of *Nitophyllum*, but the more delicate species are not very strikingly distinguished from that genus in the absence of the ternate granules.

Named from the Greek *ῥόδον*, *a rose*, and *ὑμὴν*, *a membrane*, in allusion to the ordinary colour and texture of the plants.

RHODOMENIA BIFIDA. *Bifid Rhodomenia.* TAB. 2353.

Frond thin, membranaceous, dichotomously divided; the segments broadly linear or subcuneate, obtuse. Thecæ nearly spherical, chiefly marginal.

Fucus bifidus, *Hudson. E. B.* 773. *Turner Hist. Fuc. tab.* 164. Rhodomenia bifida, *Greville Alg. Brit.* 85. *Hooker Crypt. Part* I. 289. Sphærococcus bifidus, *Agardh Spec. Alg.* I. 299. *Sprengel.* Delesseria bifida, *Lamouroux.* Halymenia bifida, *Gaillon.*

Not unfrequent on the coast of the southern and south-eastern counties of England, growing either on the rocks or on the larger Algæ. The fronds, from one to three inches in length, grow in tufts from a minute, discoid and somewhat fibrous base, dividing many times dichotomously into linear, more or less divaricated segments, which, from their tendency to divaricate and terminate obtusely, are occasionally somewhat wedge-shaped; the margins in the ordinary state of the plant are entire, but sometimes fringed with minute foliaceous processes, so numerous as to give the plant an appearance totally different. The thecæ are nearly spherical, of a deep red colour, contrasting with the generally pale pink or bright rosy hue of the frond, and are mostly situated upon the margins of the segments, as shown in our figure: the ternate granules are disposed about the extremities in irregular darkish patches. Annual. Fructification in the autumn. It adheres to paper in drying, but not very firmly, although in substance almost as thin and delicate as *Nitophyllum punctatum.*

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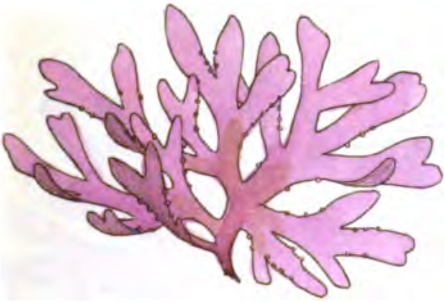
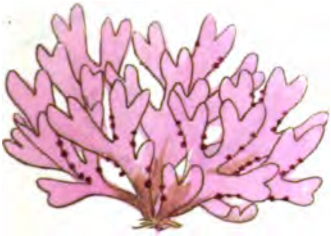
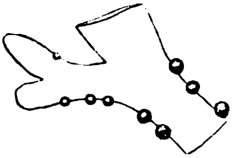
2353.







Rhodomenia biſida?

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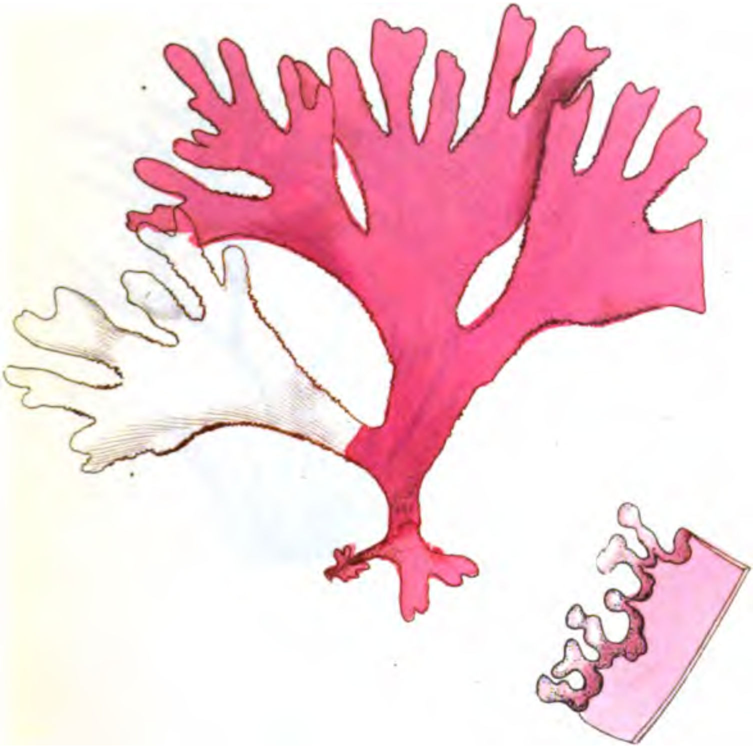

Rhodomenia laciniata

Sept^{r} 1 1802 Publiſhed by Ja^{s} Sowerby. London

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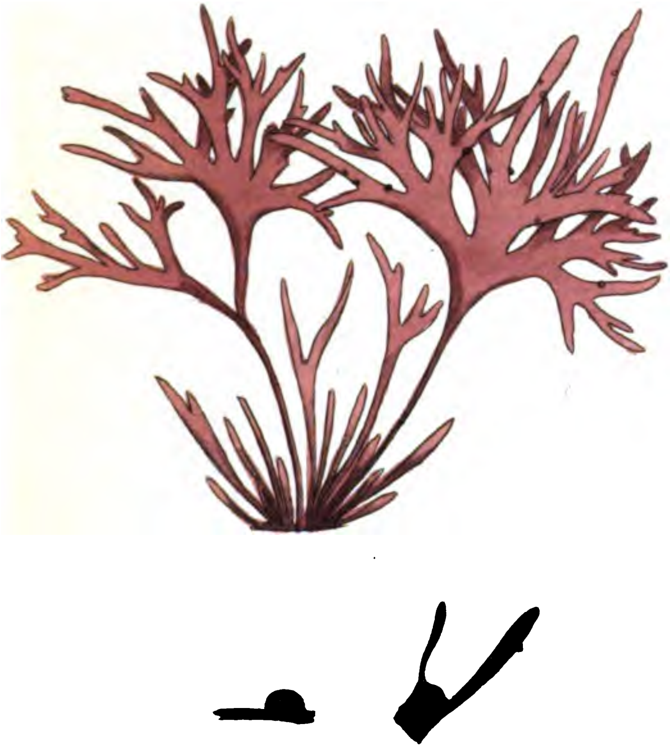
2355.



Rhodomenia Palmetta ?

Jan.y 1 1803 Publiſhed by Ja.s Sowerby London

RHODOMENIA LACINIATA. *Laciniated Rhodomenia.* TAB. **2354.**

Frond subcartilaginous, dichotomous or palmate; the segments broadly linear-oblong, obtuse or erose, often fringed with marginal leafy processes, in which the thecæ are situated. Ternate granules forming a line along the margin.

Fucus laciniatus, *Hudson. E. B.* 1068. *Turner Hist. Fuc. tab.* 69. Rhodomenia laciniata, *Greville Alg. Brit.* 86. *Hooker Crypt. Part* 1. 289. Sphærococcus laciniatus, *Agardh Spec. Alg.* 1. 297. *Sprengel.* Delesseria laciniata, *Greville Fl. Edin. Hooker Fl. Lond.* D. ciliaris, *Lamouroux.* Halymenia ciliaris, *Gaillon.* Fucus crispatus, *Stackhouse.*

Frequent, growing upon rocks and stones on almost every part of our coasts. Fronds from a small disc three or four inches to a span in length, deeply and repeatedly divided, widening upwards from a narrow base, so as to form a broadly fan-shaped expansion; the margin sometimes entire, but more frequently, at least on the coasts of Kent and Sussex, fringed or ciliated; the ultimate segments more or less obtuse. Thecæ nearly spherical, very small, uniformly disposed in minute marginal processes. Dr. Greville observes, that these processes are only found on those individuals which bear thecæ, and that the margins of those that bear the ternate granules are quite entire; this however is not always the case, as testified by a specimen now before me, in which the margin is beautifully ciliated, although the dark line of granules is very distinct, even to the naked eye, and from a specimen similarly circumstanced the figure on our Plate seems to have been taken.

This is a very handsome species, of a bright pink or rose-colour, occasionally deep red; it is of a stiff, somewhat cartilaginous substance, not at all reticulated, and adheres to paper in drying. Apparently perennial. Fructification in the spring.

RHODOMENIA PALMETTA. *Small palmated Rhodomenia.* TAB. **2355.**

Stipes cylindrical, filiform, expanding into a subflabelliform frond, more or less deeply divided in a palmate manner; the segments linear-oblong or cuneate, bifid, with entire margins and rounded axils. Thecæ imbedded in the disc and margin: ternate granules at the extremity of the segments.

Fucus Palmetta, *Esper*, *Turner Hist. Fuc. tab.* 73. *E. B.* 1120. Rhodomenia Palmetta, *Greville Alg. Brit.* 88. *tab.* 12. *Hooker Crypt. Part* 1. 290. Sphærococcus Palmetta, *Agardh Spec. Alg.* 1. 245. *Sprengel.* Delesseria Palm., *Lamouroux.* Halymenia Palm., *Gaillon.* Fucus bifidus, *Hudson.*

Not unfrequent on the southern coast of England, growing upon the rocks and epiphytic on the larger Algæ, especially *Laminaria digitata.* Fronds several from the same small, cartilaginous, partly fibrous base, from two to four inches in length, thin and membranaceous, except the stem, which is cartilaginous, rose-red or pink; the segments generally entire, obtuse or rounded at the extremities, rarely laciniated and pointed. Thecæ dark red, sessile on the margin or disc of the frond: ternate granules minute, their aggregations cloud-like, near the extremities of the segments. The cartilaginous base is perennial, and the fronds biennial, producing fructification during the second summer.

Perhaps liable to be confounded with *Chondrus membranifolius* in some of its states, but sufficiently distinguishable by its fructification and by the bright red colour of the frond. Our figure, though characteristic of the habit of the plant, represents the segments too narrow and pointed to accord with its more ordinary character.

RHODOMENIA CRISTATA. *Crested Rhodomenia**.

"Frond semicircular, membranaceous, subdichotomous; the segments somewhat dilated upwards, repeatedly subdivided; the divisions alternate, decurrent, laciniate at the ends. Thecæ spherical, imbedded in the margin of the frond."

Rhodomenia cristata, *Greville Alg. Brit.* 89. *Hooker Crypt. Part* 1. 290. Sphærococcus cristatus, *Agardh Spec. Alg.* 1. 300. *Greville Crypt. Fl. tab.* 85. *Sprengel.* Fucus cristatus, *Linn. Herb. Turner Hist. Fuc. tab.* 23. *excluding* var. γ. *not of Eng. Bot.* 1925.

Met with but rarely, growing on the stems of *Laminaria digitata*, as in the Firth of Forth according to Dr. Greville, at Wick, Caithness, by Messrs. Borrer and Hooker, and at Berwick. Fronds several from the same minute discoid base, one to two inches in length, branched from the base, nearly flat; the branches dividing once or twice dichotomously, and then into numerous alternate, pinnatifid or bipinnatifid segments, of a rose-red colour, between membranaceous and cartilaginous, adhering to paper in drying. Annual. Fructification in July.

A variety, β. of Turner, is narrow, linear throughout, and from two to four inches in length.

RHODOMENIA CILIATA. *Ciliated Rhodomenia.* TAB. **2357**.

Base fibrous, creeping. Frond subcartilaginous, somewhat lanceolate, more or less pinnated with lanceolate, copiously ciliated branches. Thecæ spherical, in the cilia.

Fucus ciliatus, *Hudson. E. B.* 1069. *Turner Hist. Fuc. tab.* 70. *fig. a—e.* Rhodomenia ciliata, *Greville Alg. Brit.* 90. *Hooker Crypt. Part* 1. 290. Sphærococcus ciliatus, *Agardh Spec. Alg.* 1. 263. *Sprengel.* Delesseria cil., *Lamouroux.* Halymenia cil., *Gaillon.*

Very common in the sea on the south and south-western coasts of England, rare in the north. Base perennial, consisting of a mass of pink, cylindrical, branched, creeping fibres, sending up several fronds

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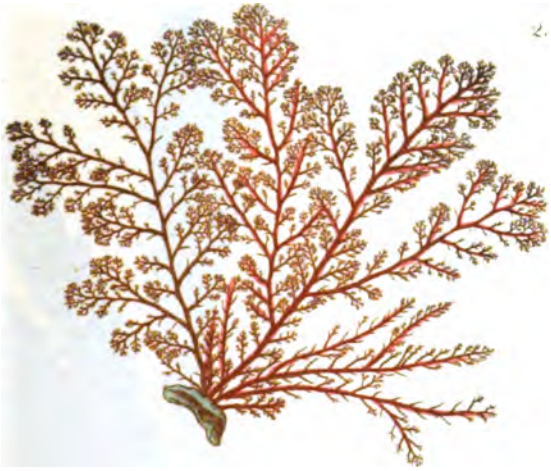
* Tab. 2356, *Fucus cristatus* of the 'English Botany,' does not belong to this species, although considered a variety of it by Mr. Turner: it is *Rytiphlæa complanata* of Agardh, and probably, as observed by Sir W. J. Hooker, not a native of our seas; however, as the plant is occasionally cast ashore, the figure will not be unacceptable to the student. Miss Hutchins sent the specimen figured to Mr. Turner from Bantry Bay, Ireland; another in my possession was taken out of the sea at Ramsgate.

1925

2356



Rhodomenia cristata !

Sept. 1. 1808. Publish'd by Ja.s Sowerby, London.

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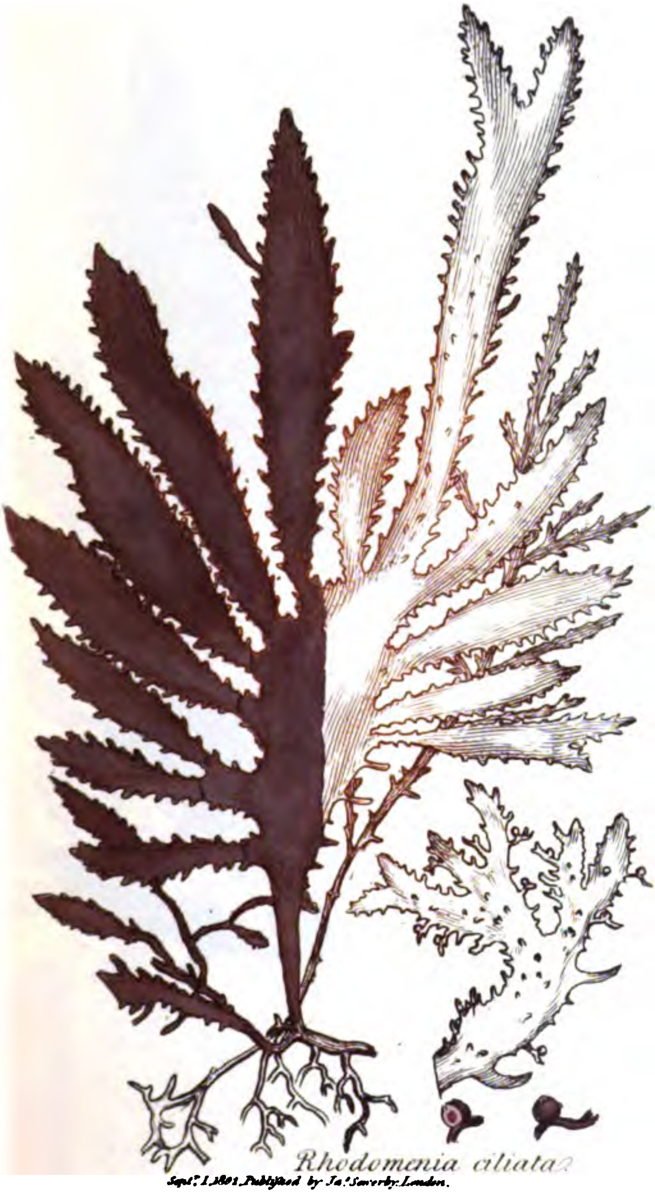

Rhodomenia ciliata

Sept.r 1.1802 Publiſhed by Ja.s Sowerby London.

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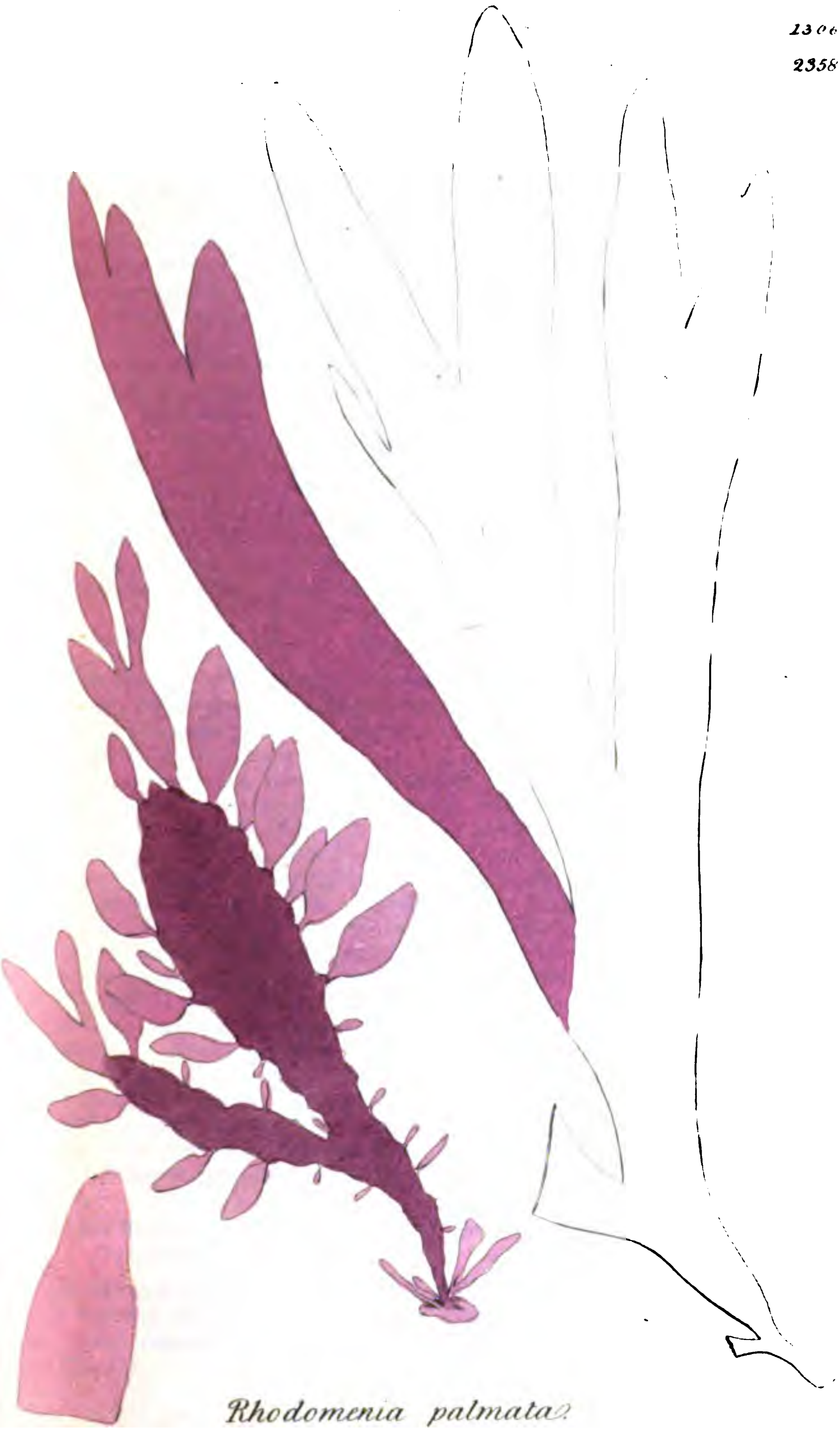
2358



Rhodomenia palmata.

May 1. 1804. Publish'd by Jas. Sowerby, London.

from three inches to a span in length, the margins of which branch into numerous unequal, linear-lanceolate appendages, arranged in a pinnated manner, more or less contracted at the lower extremity, and ciliated on the margin with small subulate processes, similar processes being often scattered irregularly over the surface of the frond. The small, spherical, dark-red thecæ are lodged in the cilia both of the margin and surface: in those individuals which have the fructification granular, it is so indistinct, owing to the minuteness of the granules, as to be imperceptible to the naked eye, unless as a faint irregular stain upon the surface of the frond.

This is a variable species in habit and general aspect: in some cases the primary frond is so short that the branches appear digitate, in others the frond is nearly entire; the cilia often resemble serratures, and sometimes they are an inch in length; while in other specimens the frond, variously divided, is filiform throughout, and the species scarcely recognizable unless by the fructification and the creeping fibrous base, so peculiarly characteristic of the present plant, if the following, *R. jubata* of Dr. Greville, be not distinct, which is far from certain. Intermediate specimens likewise occur between all of these varieties. Fructification in the winter and spring.

RHODOMENIA JUBATA. *Shaggy Rhodomenia.*

"Base fibrous. Frond flaccid, between membranaceous and coriaceous, linear-attenuated, vaguely branched; the branches simple or once or twice pinnatifid, ciliated; the cilia linear-subulate, containing the fructification."

Fucus ciliatus, vars. jubatus, lanceolatus, angustus and spinosus, *Turner Hist. Fuc. tab.* 70. *fig. f—h.* F. jubatus, *Goodenough and Woodward in Linn. Trans.* 3. *tab.* 17. *Stackhouse.* Rhodomenia jubata, *Greville Alg. Brit.* 91. *Hooker Crypt. Part* 1. 291. Sphærococcus ciliatus, vars. jubatus, linearis, angustus and spinosus, *Agardh Spec. Alg.* 1. 264. S. jubatus, *Grev. Crypt. Fl. tab.* 359.

Habitats the same as those of the preceding species, but producing its fructification in the summer, which, added to its more flaccid substance, is supposed to be indicative of specific distinction. Dr. Greville remarks that "the granules in *R. ciliata* invariably occupy the surface of the frond itself; while in *R. jubata* they invariably occupy the cilia." Notwithstanding these alleged differences, it is, I fear, impossible to draw a line of separation between the two: *R. ciliata* is one of the most diversified of the Algæ, and all of its forms have their corresponding types in the so-called *R. jubata*, if a slight variation in texture, time of fructification, or disposition of the granules be assumed as characteristic marks of distinction between them.

RHODOMENIA PALMATA. *Large palmated Rhodomenia. Dulse.* TAB. 2358.

Frond submembranaceous, palmated, the margins quite entire; the segments oblong, mostly simple. Ternate granules forming irregular, cloud-like spots over the whole frond.

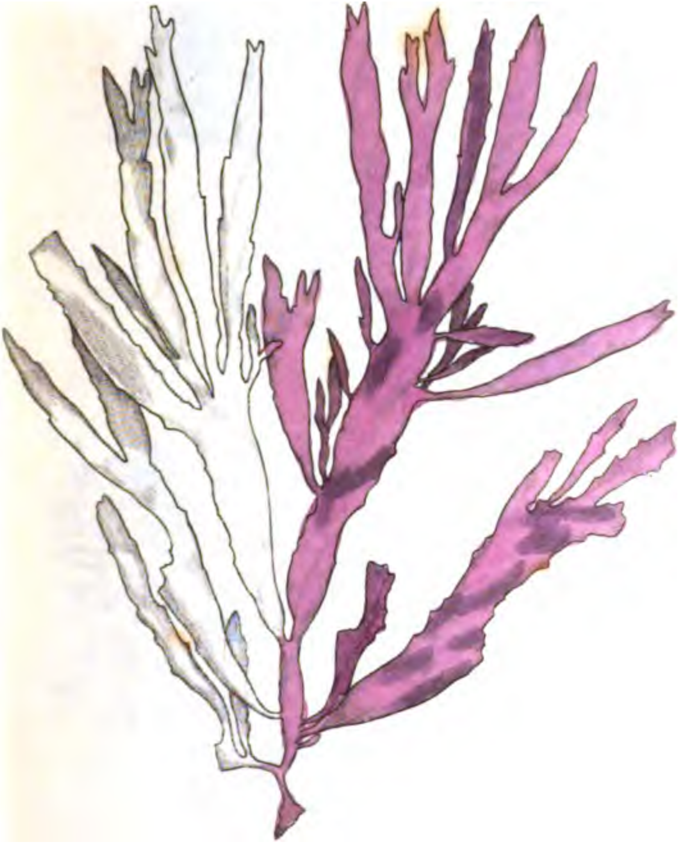
Fucus palmatus, *Linn.* *E. B.* 1306. *Turner Hist. Fuc.* 115. Rhodomenia palmata, *Greville Alg. Brit.* 93. *Hooker Crypt. Part* 1. 291. Halymenia palmata, *Agardh Spec. Alg.* 1. 204. *Sprengel.* Delesseria palmata, *Lamouroux.* Ulva palmata, *Lyngbye. Grev. Fl. Edin.*

Very common on all our rocky shores, attached to stones or to the stems of the larger *Fucoideæ.* Fronds solitary or several together, springing from a small callous base, of a livid-purplish or brownish-red, from three inches to a foot in length, more or less cleft in a palmate or digitate manner; the segments oblong or wedge-shaped, entire at the margin, rather obtuse, and often cloven at the top. Fructification only granular, or the thecæ not yet discovered; the granules spherical, imbedded in the surface of the frond, and forming large, irregular, stain-like spots. Annual or biennial? In some specimens I have observed the base throwing out a few cylindrical, creeping fibres, somewhat resembling those of *R. ciliata*, and bearing like them the rudiments of young fronds, which has led me to suspect it may be perennial, although the fronds themselves, as in numerous other instances among marine plants, are not so. Fructification in the winter. The margin of the frond is sometimes proliferous, or rather fringed with small oblong or elliptical leaflets, as in our left-hand figure.

This appears to be the most valuable and nutritious, as well as the most agreeable to the palate, of all the species of Alga eaten in the northern hemisphere. In some parts of Scotland it is much prized, by the lower classes especially, who eat it either fresh from the sea or dried in the sun, in the latter case washing it previously in fresh water; in this state they, as well as the Irish, roll it up to chew as a substitute for tobacco. The Scottish Lowlanders call it Dulse, a corruption of the Highland Celtic name, *Duillisg*, "compounded of *Duille*, a leaf, and *Uisge*, water." In Ireland it has the name of Dillesk. Various travellers and naturalists refer to the use made of this weed in different countries. The Icelanders call it Söll: they prepare it by washing it well in fresh water, and after drying, pack it in casks for preservation; eating it either with fish and butter, or boiled in milk, to which the more wealthy usually add a little rye-flour. The dried plant gives out, when moistened with water, an odour somewhat resembling that of violets, and is said to communicate a corresponding flavour to the food with which it is mingled. In some of the islands of the Grecian Archipelago it is an article of luxury as well as of economy, being boiled with meat to form ragouts, to which it imparts a red colour, besides rendering them of a thicker and more luscious consistence. The Kamtschatkadales obtain from it by fermentation an exhilarating beverage. In the colder maritime countries of the North all kinds of cattle are particularly fond of it, and sheep especially are so eager in its pursuit, that in Norway and the Western Islands they are frequently lost by going out too far from the land at low-water; hence indeed the Norwegians call it Sou-söll, or Sheep's-weed, and Bishop Gunner, the author of the 'Flora Norvegica,' named it *Fucus ovinus.*

2132

2359

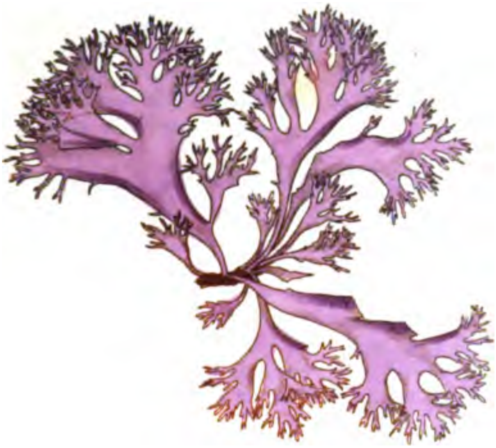


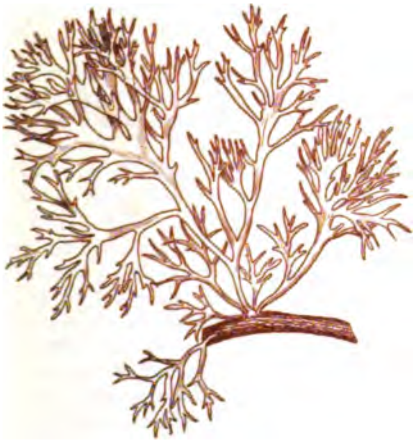
Rhodomenia sarniensis.

[illegible] published by Js. Sowerby London

2133

2360.





Rhodomenia

sobolifera.

Apl 1 1810 published by Jas Sowerby London.

Independent of its use as food, *R. palmata* is valued for its antiscorbutic quality, and doubtless with good reason, by the inhabitants of those regions where other vegetable sustenance is scarce. It contains, too, more iodine than the *Florideæ* generally, a medicinal agent of vast efficacy in disorders of the glandular and secreting system. Lightfoot informs us that in the Isle of Skye it is employed to promote perspiration in fevers.

RHODOMENIA Sarniensis. *Guernsey Rhodomenia.* Tab. **2359.**

Frond palmate, wavy, proliferous at the margins; segments linear.
Fucus Sarniensis, *Mertens in Roth. Cat. Bot.* 3. 103. *tab.* 1. *Turner Hist. Fuc. tab.* 44.

Generally regarded as a mere variety of the preceding. Of somewhat thinner texture, more branched and laciniated, with linear and narrower segments. Intermediate specimens are far from unfrequent. *R. polycarpa* of Greville is similarly circumstanced, and perhaps *R. sobolifera* likewise.

RHODOMENIA sobolifera. *Proliferous Rhodomenia.* Tab. **2360.**

Frond membranaceous, shortly stipitate; stipes filiform, dividing into branches, which expand into flat, dilated fronds, deeply and irregularly cleft, the segments linear wedge-shaped, laciniated at the apex.
Fucus soboliferus, *Fl. Dan.* *Turner Hist. Fuc. tab.* 45. *E. B.* 2133. Rhodomenia sobolifera, *Greville Alg. Brit.* 95. *Hooker Crypt. Part* 1. 292. Halymenia? sobolifera, *Agardh Spec. Alg.* 1. 218.

Epiphytic on the stems of *Laminaria digitata*, on the shores of the Orkney Islands, in Great Loch Broom, Ross-shire, in the Mull of Galway, and at Glenarm, Ireland. I am not aware of any other habitats for this plant, and therefore, if distinct, it may be accounted among our rarer species and exclusively northern. Fronds tufted, two to six inches in length, repeatedly and finely palmate, jagged and subdivided, the segments dilated upwards or wedge-shaped, cut or toothed at their extremities. The stipes or base slender, eventually flattened. Colour pink or pale purple, turning yellow or whitish in decay. Fructification unknown.

Thinner, and more obviously reticulated under the microscope than *R. Sarniensis.*

The specimen with narrower segments is from Orkney, the broader one from the Mull of Galway. I fear no dependence is to be placed upon the magnified figure, representing the surface as sprinkled with circular spots resembling sori of fructification; they may have been intended to express the obscure reticulation of the part when magnified, but if so the semblance is incorrect, and I have not the specimens to refer to in elucidation; in those before me there is certainly no corresponding appearance.

RHODOMENIA reniformis. *Kidney-shaped Rhodomenia.* Tab. 2361.

Stipes short, simple or branched, suddenly expanding into a cartilagineo-membranaceous, simple or proliferous, entire, lobed or laciniated, reniform or suborbicular frond. Thecæ and granules scattered.

Fucus reniformis, *Turner Hist. Fuc. tab.* 113. *E. B.* 2116. Rhodomenia reniformis, *Hooker Crypt. Part* 1. 292. Iridæa reniformis, *Bory. Greville Alg. Brit.* 160. Halymenia reniformis, *Agardh Spec. Alg.* 1. 201. *Sprengel.*

Only met with on the southern coast of England, either thrown on the shore or growing on rocks near the line of ebb-tide; hence it is probably an inhabitant of deep water, which would account for its rarity. Frond fixed by a small, dark red disc; the stipes simple or divided into two or more branches, which abruptly expand into roundish or kidney-shaped lobes, at first simple, but eventually splitting into several segments that increase more or less in length and breadth after division. Substance rather rigid, between cartilaginous and carnose rather than membranaceous. Colour crimson, blood-red, or pink. Fructification, in different individuals, of two kinds; either globular thecæ, or minute ternate granules, scattered unequally over the frond.

Our figure represents a small specimen, the frond being sometimes six or eight inches in length. Perennial. Fructification in the summer and autumn.

In the presence of the two kinds of fructification this curious plant certainly accords with *Rhodomenia*, but in the structure and substance of the frond it resembles *Iridæa*, being in that respect very unlike any of the *Florideæ*.

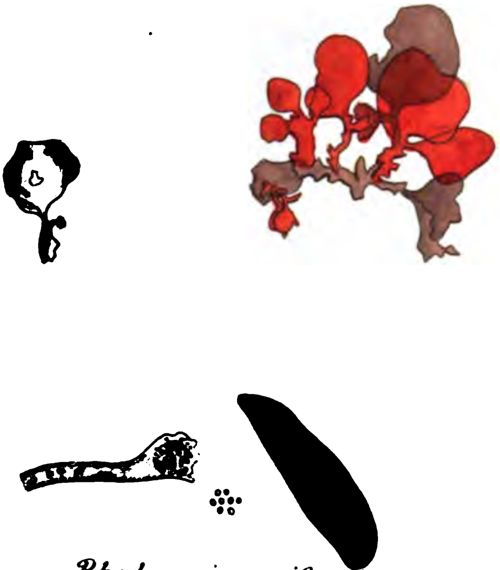
Genus DCXXXII. PLOCAMIUM. *Plocamium.*

Gen. Char. *Frond* filiform, compressed, between membranaceous and cartilaginous, fine pink-red, much-branched; branches distichous, alternately pectinate. *Fructification*: spherical sessile thecæ, and lateral minute processes, containing oblong granules, transversely divided into several parts by pellucid lines.

"The processes containing the granules are similar in structure to the rest of the frond, and seem rather to be a permanent continuation or ramification of it than organs thrown out to perform the temporary purpose of fructification. The granules themselves are very different from those of the preceding genera of the family, being oval or elliptical-oblong, and surrounded by a pellucid limbus, and transversely divided into four or five parts, which ultimately separate."—*Greville.*

2116

2361.

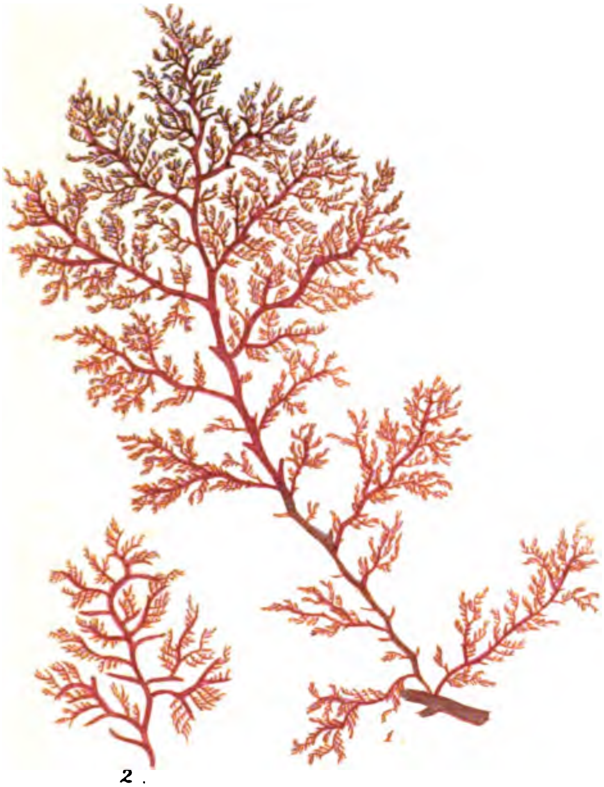


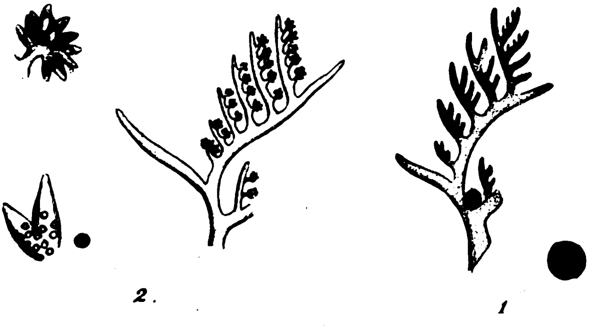
Rhodomenia reniformis.

Feb 1 1810 published by Jas Sowerby London.

1242

2362.





Plocamium coccineum.

Novr. 1. 1803. Published by Jas. Sowerby, London

The "pellucid limbus" is, properly speaking, a case or cellule of which the contained granules are the endochrome. The individuals in which these granule-bearing processes occur never develope the globular thecæ.

The finely branched and frequently matted and intertwined fronds are alluded to in the generic name, originally proposed by Lamouroux, from the Greek *πλόκαμος*, *contorted hair.*

PLOCAMIUM COCCINEUM. *Scarlet Plocamium.* TAB. **2362**.

Fucus coccineus, *Hudson.* *E. B.* 1242. *Turner Hist. Fuc. tab.* 59. Plocamium coccineum, *Lyngbye Hydroph. Dan.* 39. *tab.* 9. *Greville Alg. Brit.* 98. *tab.* 12. *Hooker Crypt. Part* 1. 293. P. vulgaris, *Lamouroux.* *Gaillon.* Delesseria Plocamium, *Agardh Spec. Alg.* 1. 180. D. coccinea, *Greville Fl. Edin.* Fucus Plocamium, *Gmelin.* *Lightfoot.*

The most common of all the *Florideæ* on almost every part of our coast. The fronds grow, generally clustered, from a small base furnished with a bunch of fine, entangled, creeping fibres, which are perennial: they vary from one or two inches to a foot or more in length, and in the thickness or rather breadth of their segments, from the fineness of a hair to two or three times that of the specimen figured. Branches unequally alternate and spreading, dividing and subdividing in a manner so peculiar that it is impossible to confound this with any other species of Alga: the smaller ones are alternately secund, from three to six segments extending nearly parallel to each other on one side, and then about the same number on the other; each of these segments is pectinated or set at equal distances with small ramuli, three to five in number, resembling the teeth of a comb, always on the upper or inner margin, and the ramuli often divide a second or even third time, bearing each a similar number of successively smaller ones in the same position. The dark-red globular thecæ represented at fig. 1. grow mostly on the margins of the smaller branches and opposite to the ramuli, and are about the size of poppy-seed. The oblong or sublanceolate, granule-bearing processes occupy the places of the small ultimate ramuli, being sometimes solitary, or consisting of the ramuli themselves more or less distended by the production of the granules, but more frequently forming little tufts, as seen in fig. 2. Both the kinds of fructification occur in the latter part of the summer or autumn. The fronds are apparently perennial as well as the fibrous base.

Few if any marine plants are comparable to this in beauty: the multiplicity and regularity of its delicate ramifications, and the brilliancy of its colour, a lively crimson verging to scarlet, often varied with orange or yellow, and scarcely undergoing any perceptible change by drying, render it almost equally pleasing upon paper as when seen alive, floating in its native element in the shallow pools left at ebb-tide among the white chalk of Kent or Sussex. When composition landscapes were in vogue this elegant plant was much in request, and generally formed the principal portion of the foliage and shrubbery in those manufactured at marine watering-places; hence it acquired the name of Landscape-weed.

It is a native of the southern as well as of the northern hemisphere.

GENUS DCXXXIII. MICROCLADIA. *Microcladia.*

GEN. CHAR. *Frond* filiform, compressed, subcartilaginous, irregularly branched, the branches distichous. *Fructification*: sessile spherical thecæ, invested by an involucrum, in the form of several short ramuli; or ternate granules in the swollen apices of the branches.

Established by Dr. Greville for the segregation of the only known species, *M. glandulosa*, previously referred by Agardh to the genus *Delesseria*, and resembling *Plocamium* somewhat in habit, but not at all in fructification; differing as well in the structure of the granules as in the presence of an involucrum around the thecæ: in the latter feature indeed it approaches *Ptilota*, but the thecæ are solitary, and the texture and habit of the frond totally dissimilar.

The generic name, from μικρὸς, *small*, and κλάδος, *a branch*, is expressive of the delicate ramifications of the frond.

MICROCLADIA GLANDULOSA. *Glandular Microcladia.* TAB. 2363.

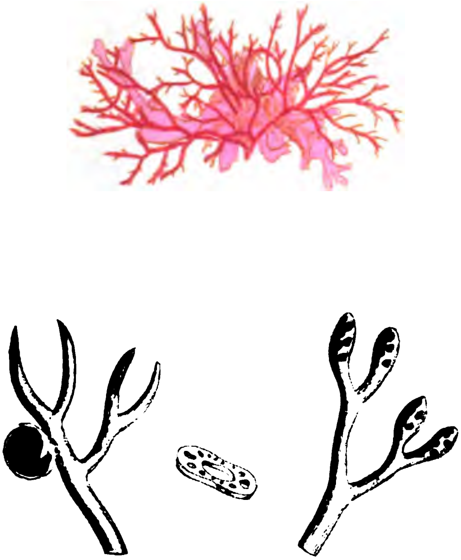
Fucus glandulosus, *Turner Hist. Fuc. tab.* 38. *E. B.* 2135. Microcladia glandulosa, *Greville Alg. Brit.* 99. *tab.* 13. *Hooker Crypt. Part* 1. 293. Delesseria glandulosa, *Agardh Spec. Alg.* 1. 192.

Found only on the coast of Devonshire and Cornwall, where it is thrown up by the tide, attached to the larger species of Algæ. Fronds from a minute discoid base, light red or pink, finely reticulated, one to three inches in length, divided from the base into numerous, very slender, irregularly alternate branches, the ultimate divisions of which are very short, dichotomous, and more or less incurved. Thecæ sessile, solitary, globular, invested at the base by an involucrum of two or more short, incurved processes: ternate granules on distinct plants, imbedded irregularly in the swollen extremities of the ultimate branches. Probably annual, but has been found in fructification throughout the year.

This is one of our rarest species, and from the circumstances under which it is generally met with, seems to be a native of warmer latitudes.

2135

2363.

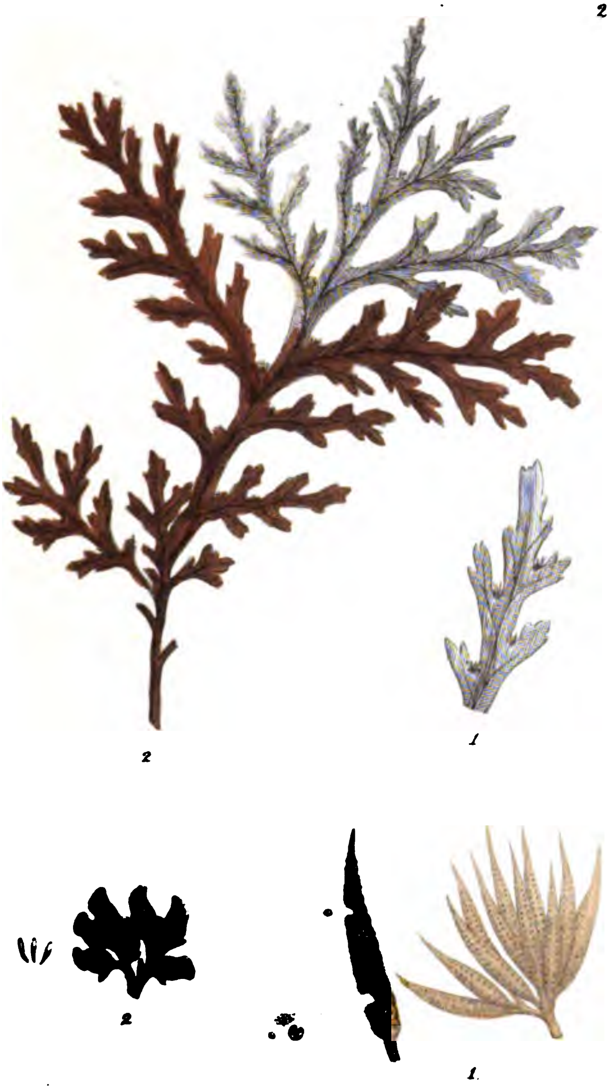


Microcladia glandulosa?

Jan 1 1812 published by J. Sowerby London

1241

2364



Odonthalia dentata

Nov.r 1. 1803. Publish'd by Ja.s Sowerby. London.

Genus DCXXXIV. ODONTHALIA. *Odonthalia.*

Gen. Char. *Frond* plane, between membranaceous and cartilaginous, dark vinous-red, with an imperfect or obsolete midrib, alternately toothed on the margin. *Fructification* either marginal, axillary, or in the teeth: either thecæ, containing pyriform sporules fixed by their base; or ternate granules, imbedded in linear-lanceolate receptacles.

A genus founded by Lyngbye for the reception of the *Fucus dentatus* of Linnæus; named in allusion to the remarkable incisions of the margin of the frond, from ὀδοὺς, *a tooth*, and θάλασσα, *the sea*; literally, *Sea-Toothwort.*

ODONTHALIA dentata. *Toothed Odonthalia.* Tab. 2364.

Frond branched, spreading; the branches distichous, pinnatifid; pinnulæ sharply toothed at the apex, alternate. Thecæ ovate, pedunculate, in axillary clusters.

Fucus dentatus, *Linn.* *E. B.* 1241. *Turner Hist. Fuc. tab.* 13. Odonthalia dentata, *Lyngbye Hydroph. Dan.* 9. *tab.* 3. *Greville Alg. Brit.* 101. *tab.* 13. *Hooker Crypt. Part* 1. 293. Rhodomela dentata, *Agardh Spec. Alg.* 1. 370. *Sprengel.* Delesseria dentata, *Lamouroux.*

Frequent along the northern shores of Great Britain and Ireland, growing upon rocks and on the old stems of *Laminariæ*, but rarely seen in the German Ocean south of the Humber. Fronds, often several together, springing from a small hard disc, three or four inches to a foot in length, flat, submembranaceous, doubly pinnatifid, all the segments linear-oblong, alternate. Fructification in the axils of the pinnulæ or ultimate segments, both kinds always in clusters from a branched peduncle. Thecæ ovate, pointed, opening at the apex, containing numerous clavate sporules, fixed by their base to the lower part of the thecæ: the thecæ probably vary in form in different localities; I have never seen them so round as represented in the 'Algæ Britannicæ'; the urceolate figure assigned to them in our Plate is a consequence of the original drawing being made from a dried specimen, still preserved in the English Botany herbarium, and no recent one was within my reach to correct or identify it with the natural state. The granule-bearing processes are very slender, linear-lanceolate, resembling cilia to the naked eye, pale or colourless, and contain each a double row of dark-red ternate granules. The plant when recent is of a dull red or purplish hue, sometimes passing into pink at the extremities, and in drying generally changes to an olive or blackish-green, and adheres very slightly to paper. Perennial. Fructification in the early spring.

GENUS DCXXXV. RHODOMELA. *Rhodomela.*

GEN. CHAR. *Frond* cylindrical or compressed, filiform, much-branched, coriaceo-cartilaginous. *Fructification*: subglobose thecæ containing free, pyriform sporules; or pod-like receptacles with imbedded ternate granules.

A very heterogeneous assemblage of marine plants was comprised under this genus by Agardh, which has been much reduced by Dr. Greville, leaving it however still in a very equivocal condition, and probably, as he observes, open to a further curtailment hereafter.

The British species are four in number, agreeing very nearly in fructification, but certainly not in internal structure; an important consideration in the allotment of genera among plants so low in the scale of vegetable nature, and subject to such modifications of external character as are even the most complicated of the Algæ. The two sections are in some degree indicative of the diversity alluded to, as the uniform incurvation of the extremities of the frond in one is dependent upon a peculiarity of organization not belonging to the other, which is further distinguished by the production of annually deciduous ramuli.

The name, from ῥόδον, *a rose*, and μέλας, *black*, refers to the change of colour the plants undergo in drying.

The British species are perennial.

* *Summits of the branches straight.*

RHODOMELA SUBFUSCA. *Brownish Rhodomela.* TAB. 2368.

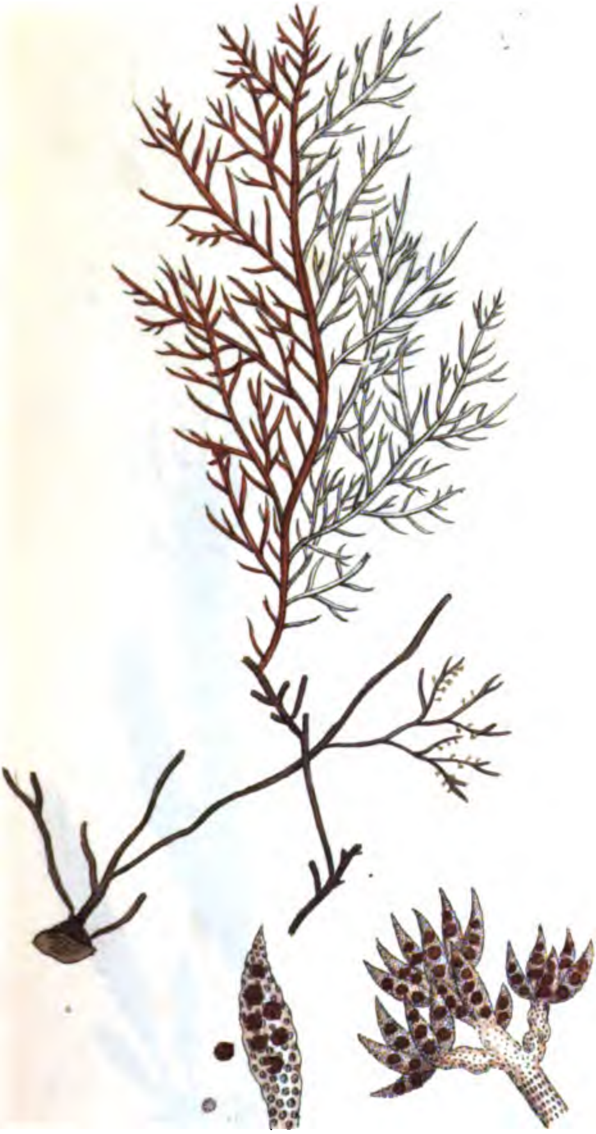
Frond filiform, much-branched; branches pinnate or subalternate, often clustered, subulate, without apparent articulations.

Fucus subfuscus, *Woodward in Linn. Trans.* 1. 131. *tab.* 12. *E. B.* 1164. *Turner Hist. Fuc. tab.* 10. Rhodomela subfusca, *Agardh Spec. Alg.* 1. 378. *Greville Alg. Brit.* 103. *Hooker Crypt. Part* 1. 294. Gigartina subfusca, *Lamouroux. Lyngbye. Greville Fl. Edin.* Fucus variabilis, *Goodenough and Woodward, Linn. Trans.* 3. 220.

Frequent on most rocky parts of the coast both of Great Britain and Ireland. Fronds attached either to rocks and stones, or to the stems of the larger *Laminariæ* and *Fuci*, generally numerous from the same thin, small, discoid base, three or four inches to a foot in length, much, and for the most part alternately branched; the ultimate branches or ramuli short and subulate, all erecto-patent. Fructification in the spring and early summer. Thecæ on the younger branches, ovate, subsolitary; pod-like receptacles clustered, linear-lanceolate: the latter form only is represented on our Plate. Perennial or biennial.

1164

2365

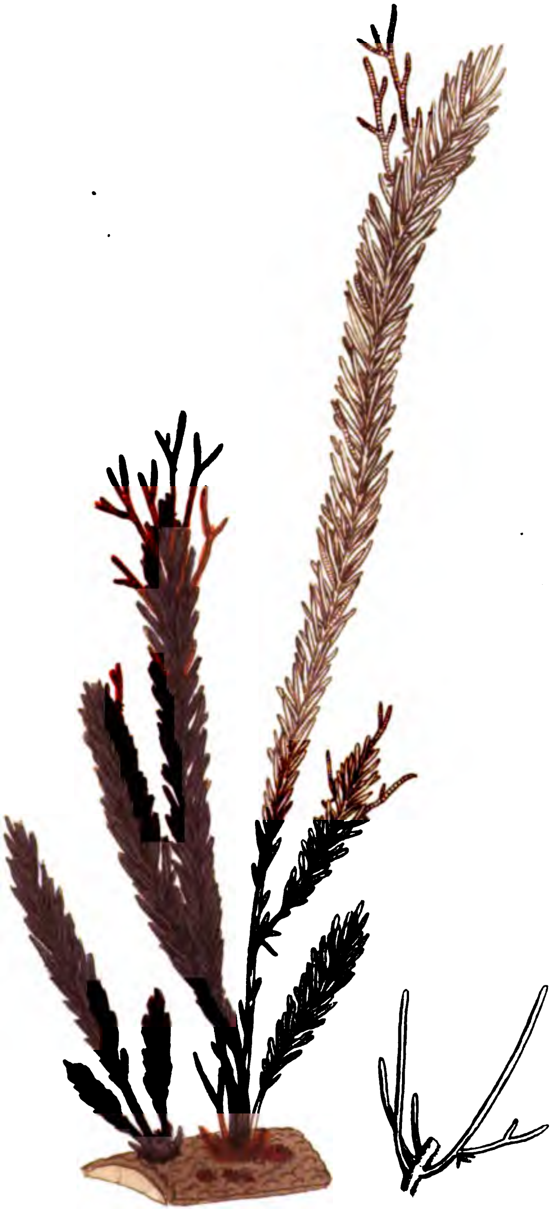


Rhodomela subfusca.

May 1 1803 Published by Jas. Sowerby London.

1163

2366.

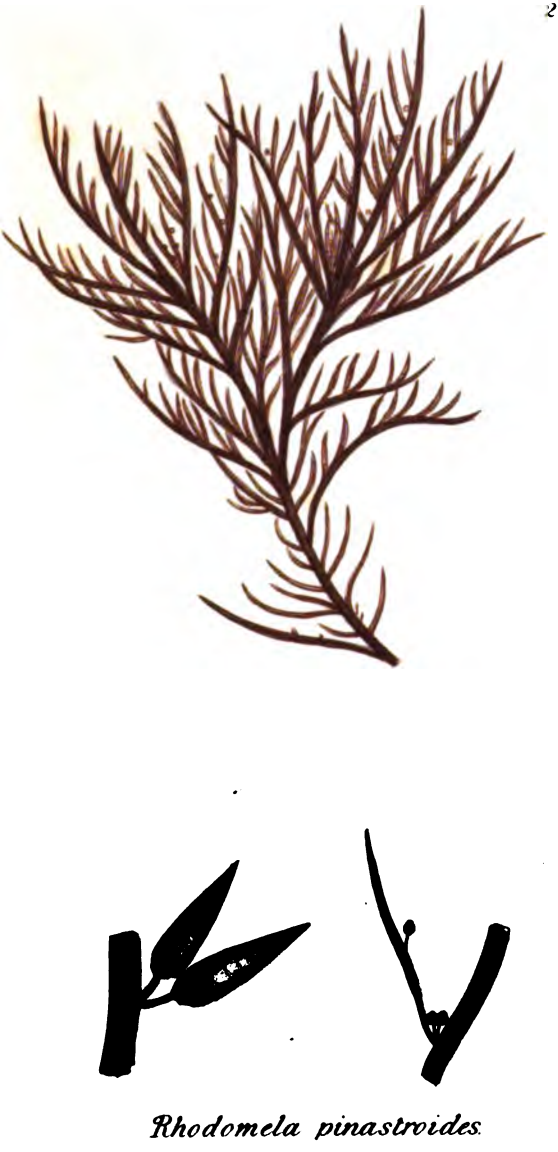


Rhodomela Lycopodioides.

May 1 1803 Publiſhed by Jas Sowerby, London.

1042

2367.



Rhodomela pinastroides.

July 1. 1802. Publiſhed by Jas Sowerby, London.

Of a light reddish-brown, paler in the younger branches, which change but little in drying. Taken in the summer time it adheres to paper through the medium of these branches, which however are chiefly deciduous on the approach of winter, at which time the plant has an appearance so different, that it would scarcely be recognized by one who had only seen it in its summer state. Our figure seems to have been taken from a specimen collected in the early spring, on which the pod-like receptacles are often very abundant.

The young ramuli are frequently terminated in the summer season by tufts of fine, red, conferva-like filaments.

RHODOMELA LYCOPODIOIDES. *Club-moss Rhodomela.* TAB. **2366.**

Frond cylindrical, mostly simple, not apparently articulated, densely clothed with filiform, closely imbricated, patent ramuli, generally forked at the apex, and intermixed with the setaceous remains of a former series.

Fucus lycopodioides, *Linn.* *E. B.* 1163. *Turner Hist. Fuc. tab.* 12. Rhodomela lycopodioides, *Agardh Spec. Alg.* 1. 377. *Sprengel. Greville Alg. Brit.* 102. *Hooker Crypt. Part* 1. 294. Gigartina lycopodioides, *Lyngbye.* *Grev. Fl. Edin.*

Found occasionally on various parts of the coast, but more frequently in the North, growing upon the stems of *Laminaria digitata.* Fronds more or less tufted, generally a little branched at the base, six or eight inches to a foot or more in length, densely covered with short, setaceous, rigid, spreading ramuli, among or from which, during the summer season, spring numerous filiform or capillary, dichotomous or variously branched processes, apparently destined for the production of the fructification, which is only found upon them, and eventually deciduous. Thecæ globular; pod-like receptacles of the granules lanceolate, clustered: both kinds make their appearance about May or June, and disappear before the autumn, together with most of the filiform processes. The whole plant is of a reddish-brown colour in the living state, but becomes quite black in drying, exceedingly rigid, and does not adhere at all to paper.

Our Plate represents the plant in its winter condition, in which only it bears that resemblance to a *Lycopodium* which has obtained for it the above specific name.

** *Summit of the branches incurved.*

RHODOMELA PINASTROIDES. *Pinaster-like Rhodomela.* TAB. **2367.**

Frond cylindrical, branched; the branches thickly set with secund, apparently jointed ramuli, incurved at the apex.

Fucus pinastroides, *Gmelin.* *E. B.* 1042. *Turner Hist. Fuc. tab.* 11. Rhodomela pinastroides, *Agardh Spec. Alg.* 1. 381. *Greville Alg. Brit.* 104. *tab.* 13. *Hooker Crypt. Part* 1. 294. *Sprengel.* Gigartina pinastroides, *Lyngbye.* Fucus incurvus, *Hudson.*

Frequent on almost every rocky coast throughout the kingdom, but especially in the South. A rigid, cartilaginous, bushy species, of a dull brownish-red colour, changing to black in drying. Frond fixed to the rocks by a small fibrous, or somewhat spongy base, from a few inches to a foot in height, very much branched in a fastigiate manner; all the branches thickly set with subequal, mostly simple ramuli, often growing in pairs, and more or less secund: all of the divisions are cylindrical, tapering to awl-shaped at the extremity, which both in the branches and ramuli is always incurved. The fructification appears in the autumn, either in the form of globular stalked thecæ, situated upon the ramuli or in their axils; or as ternate granules, imbedded in minute, lanceolate, pod-like, straight or curved receptacles, growing upon the ramuli, generally in pairs.

The branches, ramuli, and even the pod-like receptacles, have the appearance of being articulated, like a *Conferva*; a character due to the very regular arrangement of the vesicular structure, which, as observed by Dr. Greville, and beautifully expressed in his magnified figure, consists "of a mass of uniform, oblong, hexagonal (dodecahedral) cells, arranged in transverse rows, so that the junction of the top of one set of cells with the commencement of the next set forms the dark line which bears the external character of an articulation."

RHODOMELA SCORPIOIDES. *Scorpion's-tail Rhodomela.* TAB. **2368.**

Frond capillary, much-divided, three or four times pinnated with alternate horizontal branches, the ultimate ones incurved at the apex.

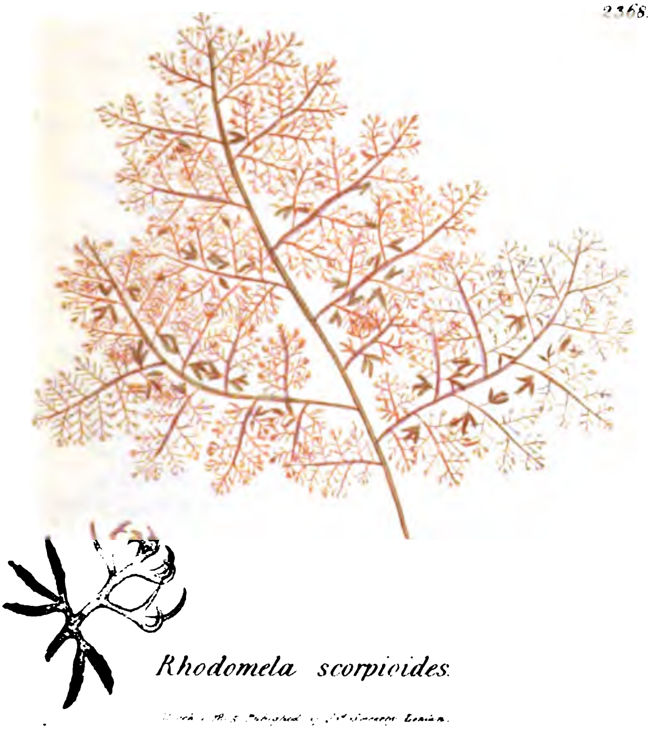
Fucus scorpioides, *Hudson Fl. Ang. ed.* 1. 471. *Gmelin.* Fucus amphibius, *Hudson Fl. Ang. ed.* 2. 590. *E. B.* 1428. *Turner Hist. Fuc. tab.* 109. Rhodomela scorpioides, *Agardh Spec. Alg.* 1. 380. *Greville Alg. Brit.* 105. *Hooker Crypt. Part* 1. 294. *Sprengel.* Plocamium amphibium, *Lamouroux.*

Far from unfrequent on the southern and eastern shores of England, growing upon rocks and stones about high-water mark, and in saline ditches and marshes, frequently adhering in the latter case to the stems and roots of *Atriplex*, *Salicornia*, and other sea-side plants. The fronds form dense entangled tufts, from one to three inches in height, of a subcartilaginous substance, and pale, livid, reddish-brown or purplish colour: they are cylindrical, capillary, and repeatedly and alternately pinnated; their ultimate segments acute, and singularly incurved or rolled in like the tail of a scorpion, whence the specific name. No other fructification has been found on British specimens, except the lanceolate, pod-like receptacles figured on our Plate, which appear during the summer, and are merely the lateral pinnulæ swollen, containing in general two irregular rows of ternate granules; but according to Roth, minute roundish thecæ are sometimes found in the axils, which would to a certain extent justify the reference of this curious plant to *Rhodomela.*

In structure, though cellular throughout, it is very different from *R. pinastroides*, the cellules being arranged in parallel longitudinal series, not alternately or transversely, and having, according to Dr.

1428

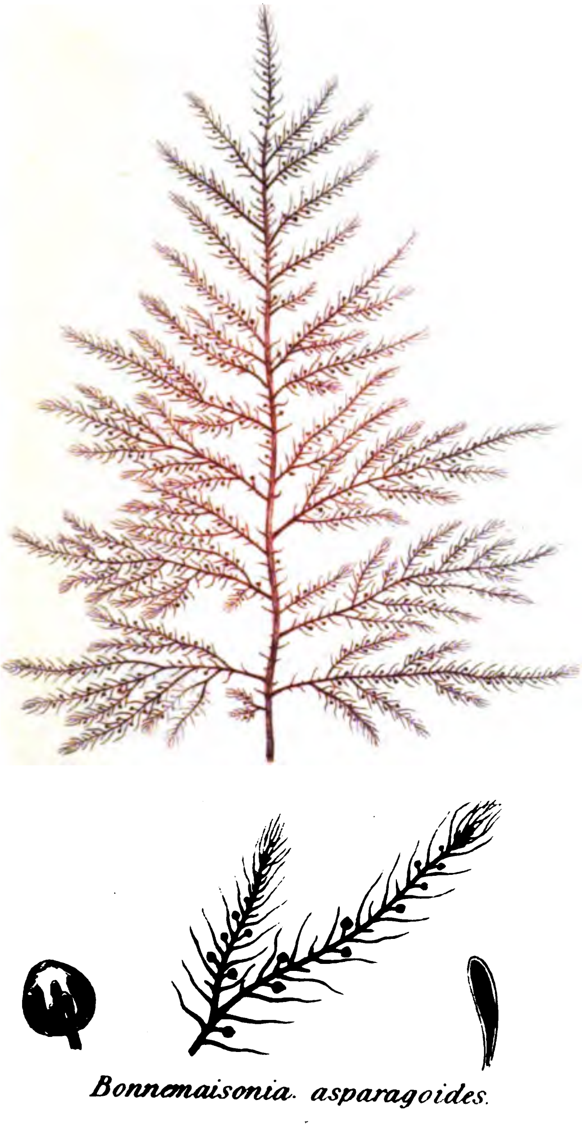
2368.



Rhodomela scorpioides.

[illegible] Published by [illegible] London.

2360.



Bonnemaisonia asparagoides.

March 1 [illegible] Publish'd by J. Sowerby London

Greville, a coloured filament traversing their longer axis. Mr. Turner regarded it as allied to *Polysiphonia fastigiata,* one of the *Conferoideæ,* an opinion in which Dr. Greville coincides, or at least hints that it may hereafter form the type of an intermediate genus.

GENUS DCXXXVI. BONNEMAISONIA. *Bonnemaisonia.*

GEN. CHAR. *Frond* membranaceous, compressed or plane, filiform, much-branched; the branches pectinated with distichous cilia. *Fructification*: sessile or pedicellate thecæ, containing a cluster of pyriform, compound sporules, fixed by their base.

The sporules, or at least the organs so called, are rather clavate than pyriform, and appear to consist, not of one uniform mass, but of several. Agardh describes them as concatenated, and such indeed may be their appearance sometimes in an incipient state of the fructification, when they are not unlike the jointed filaments of *Asperococcus,* but their nearer resemblance is to the thecæ, so styled, of *Cutleria multifida,* the peculiarity of those of the present genus consisting in their clusters being invested by a case opening at the apex. Only three species are referred to the genus by Agardh, who named it in honour of M. Bonnemaison, a celebrated French algologist.

BONNEMAISONIA ASPARAGOIDES. *Asparagus-like Bonnemaisonia.* TAB. 2369.

Frond compressed, very much branched; branches ciliated with distichous, opposite ramuli. Thecæ pedunculated, alternating with the ramuli.

Fucus asparagoides, *Woodward in Linn. Trans.* 2. 29. *tab.* 6. *E. B.* 571. *Turner Hist. Fuc. tab.* 101. Bonnemaisonia asparagoides, *Agardh Spec. Alg.* 1. 197. *Sprengel. Greville Alg. Brit.* 107. *tab.* 13. *Hooker Crypt. Part* 1. 295. Plocamium asparagoides, *Lamouroux.*

Found occasionally on various parts of the coast of England and Ireland, but not common. Frond fixed to rocks and stones by a minute discoid base, from three inches to a span in length, much and alternately branched; the branches distichous, terete and filiform; thickly set with small, pectinate, opposite, awl-shaped, acute ramuli. Thecæ subovate, stalked, occupying the places of the ramuli, with which they alternate on their own side, being opposite to those of the other. The colour when fresh is a pale transparent crimson, scarcely altered by drying. It adheres firmly to paper. Annual. Producing its fructification during the summer.

One of the most elegant and delicate of our marine plants. Dr. Greville remarks that the ramuli seem to be really alternate, as described by Roth, and not opposite, but in this he is surely mistaken: in the barren parts of all the specimens within my reach they are uniformly opposite, unless here and there, owing to the evident abortion of one; the other is solitary; indeed, the very circumstance of the pedicellated thecæ being always opposite to ramuli is an evidence of this being the normal order of development, the thecæ being regarded, according to the general law of vegetable production, as modifications of the ramuli.

GENUS DCXXXVII. LAURENCIA. *Laurencia.*

GEN. CHAR. *Frond* compressed or cylindrical-filiform, between gelatinous and cartilaginous, mostly yellowish or purplish-red. *Fructification*: either ovate thecæ with a terminal pore, containing a cluster of stalked, pyriform sporules fixed by their base, or ternate granules imbedded in the ramuli.

About a dozen known species rank under this genus, all of which, as Dr. Greville observes, " have their branches either obtuse and often lobed, or set with little incrassated ramuli; and it is in these parts that the ternate granules are always imbedded. The base is scutate, but generally throws out a few creeping fibres."—*Alg. Brit.*

Named by Lamouroux, in memory of his friend M. De la Laurencie, a French naturalist.

* *Ramuli turgid, obtuse.*

LAURENCIA PINNATIFIDA. *Pinnatifid Laurencia.* TAB. **2370.**

Frond compressed, subcartilaginous, twice or thrice pinnatifid; branches alternate, the ultimate ones obtuse, simple or lobed.

Fucus pinnatifidus, *Hudson. E. B.* 1202. *Turner Hist. Fuc. tab.* 20. Laurencia pinnatifida, *Lamouroux. Greville Alg. Brit.* 108. *tab.* 14. *Hooker Crypt. Part* 1. 295. Chondria pinnatifida, *Agardh Spec. Alg.* 1. 337. *Grev. Fl. Edin. Sprengel.* Gelidium pinnatifida, *Lyngbye Hydroph. Dan.* 40. *tab.* 9.

Very common on rocks on almost every part of the coast, varying considerably in form and division, and in the breadth and thickness of its segments. Fronds two inches to a span or more in length, forming dense tufts, creeping at the base, compressed, twice or thrice pinnatifid, the divisions all spreading, dilated, obtuse, and thickened at the extremities. Thecæ ovato-globose, sessile upon or near the extremities of the ultimate ramuli. Ternate granules, on separate plants, imbedded in the ramuli near the apex. Both kinds of fructification

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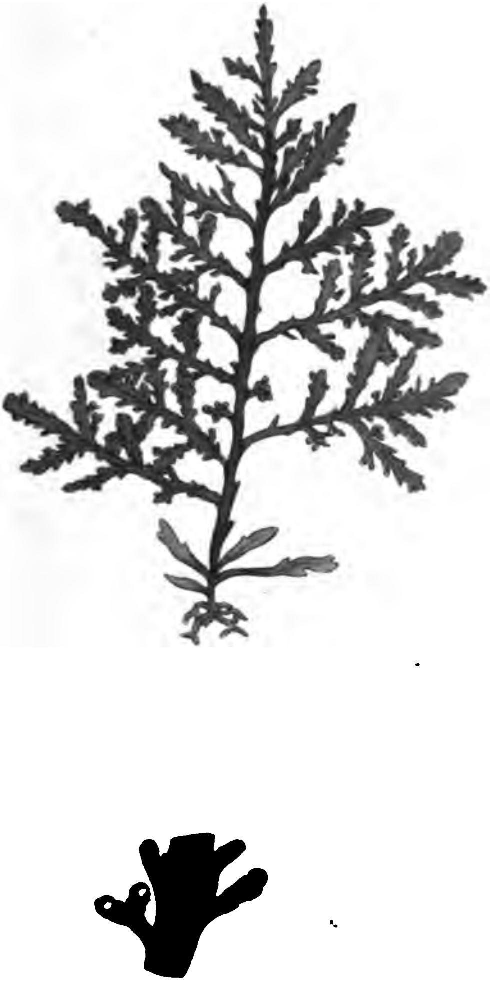
2370.



Laurencia pinnatifida?

Augt 1 1803. Published by Jas. Sowerby, London.

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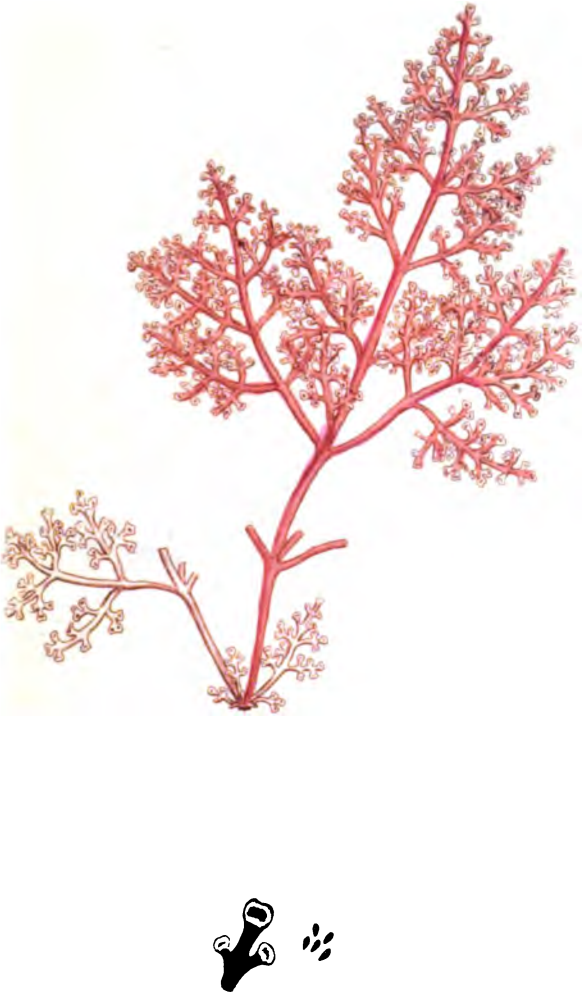
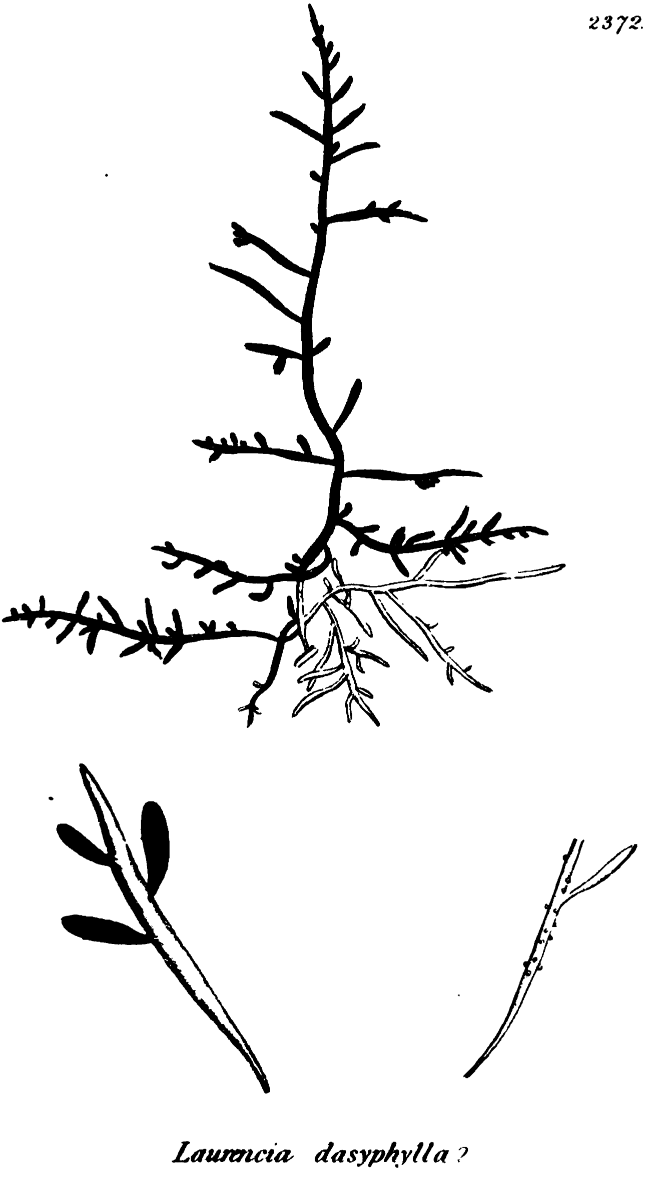
2371.



Laurencia obtusa?

Augt 1 1803 Publiſhed by Jas Sowerby London

847
2372.



Laurencia dasyphylla ?

March 1 1801 Published by Jas Sowerby London

are liable to modification, the place of the thecæ being sometimes occupied by cup-like processes resembling the shield of a lichen, at other times by bodies presenting an intermediate state between the latter and the normal form, as figured in the 'Algæ Britannicæ'; Dr. Greville has likewise noticed in some specimens, oblong red bodies imbedded in place of ternate granules. Indeed there is no plant in the whole series of British marine vegetation that is more multifarious, either in regard to its fructification or in the form of the frond, than this. The following varieties are distinguished :—

β. Osmunda. Frond flat, generally subdivided; ramuli short and multifid.—*Turner.* Fucus Osmunda, *Gmelin. Stackhouse.*

γ. angusta. Frond roundish; ramuli cylindrical, thickened upwards, set on all sides of the stem, often clustered and simple.—*Turner.*

δ. tenuissima. Frond flat; ramuli very thin and much-branched, the branches divaricated.—*Turner.*

Perennial. Fructification in the summer and autumn. It has a pungent flavour, and is eaten in Scotland under the name of Pepper-Dulse.

LAURENCIA OBTUSA. *Blunt-pointed Laurencia.* TAB. **2371.**

Frond cylindrical, filiform, twice or thrice pinnated, the branches mostly opposite; ultimate ramuli very short, truncated, spreading.

Fucus obtusus, *Hudson. Turner Hist. Fuc. tab.* 21. *E. B.* 1201. Laurencia obtusa, *Lamouroux. Greville Alg. Brit.* 111. *Hooker Crypt. Part* 1. 296. Chondria obtusa, *Agardh Spec. Alg.* 1. 340. *Grev. Fl. Edin. Sprengel.*

Epiphytic on the larger Algæ on various parts of the coast, but especially in the South of England and Ireland, rare in Scotland. Fronds often several from the same small base, three to six inches long, branched from near the bottom of the stem, repeatedly pinnated; the branches and their subdivisions mostly opposite, the ultimate ones clavate, truncate or rounded at the extremity. Thecæ ovate, on the younger branches; granules collected in the centre of the dilated extremities of the ultimate ramuli. Annual. Fructification in the summer.

In substance this is somewhat cartilaginous, but brittle; the branches and their subdivisions are cylindrical, slightly flattened, and always diverging horizontally; they are sometimes ternate. The delicate light red or salmon-colour of the frond is very fugitive. Adheres to paper in drying.

** *Ramuli much attenuated at the base.*

LAURENCIA DASYPHYLLA. *Thick-leaved Laurencia.* TAB. **2372.**

Frond cylindrical, filiform, irregularly pinnated; branches patent, mostly simple; ramuli subtruncate, very short, attenuated at the base.

Fucus dasyphyllus, *Woodward in Linn. Trans.* 2. 239, *tab.* 23. *fig.* 1–3. *E. B.* 847. *Turner Hist. Fuc. tab.* 22. Laurencia dasyphylla, *Gre-*

ville Alg. Brit. 112. *tab.* 14. *Hooker Crypt. Part* 1. 296. L. cæspitosa, *Lamouroux*. Chondria dasyphylla, *Agardh Spec. Alg.* 1. 350. *Sprengel*. Gigartina dasyphylla, *Lamouroux*.

Found on various parts of the British coast, especially the southern shores of England, growing on rocks, and occasionally epiphytic. Fronds generally several from a small base, resembling that of *L. obtusa*, and, like it, sometimes throwing out a few fibres, three or four inches to a span in length, cylindrical, succulent, branched from the lower part: branches scattered, irregularly pinnated, horizontal, various in length, the lower most generally subdivided, the upper ones always simple; all mostly bearing very short, irregularly scattered, obovate or cylindrical and blunt ramuli, with a very taper base. Thecæ on the younger branches, minute, ovate or roundish; ternate granules imbedded in the extremities of the ramuli. Annual. Fructification in the summer.

Colour pale red or rose, often passing into green, little altered by drying. It adheres to paper.

The frond is said to be generally transversely striated, or apparently jointed, like that of *Rhodomela pinastroides*, and it is so figured in the 'Algæ Britannicæ,' but I have rarely found it so, and am far from being satisfied that this character is not indicative of a distinct species.

LAURENCIA TENUISSIMA. *Slender Laurencia.* TAB. 2373.

Frond filiform, much-branched, irregularly pinnate; branches patent, mostly simple; ramuli setaceous, very short, tapering to each extremity.

Fucus tenuissimus, *Goodenough and Woodward in Linn. Trans.* 3. 215. *tab.* 19. *E. B.* 1882. *Turner Hist. Fuc. tab.* 100. Laurencia tenuissima, *Greville Alg. Brit.* 113. *Hooker Crypt. Part* 1. 296. Chondria tenuissima, *Agardh Spec. Alg.* 1. 352. *Sprengel*. Gigartina tenuissima, *Lamouroux*.

Epiphytic on larger Algæ, and likewise growing on rocks on the southern coast of England, where it is far from being rare. Fronds often numerous from the same base, from a few inches to a foot in length, very much and alternately branched: branches all filiform, more or less compound, and set with numerous bristle-like, pointed ramuli, considerably attenuated at their base. Thecæ scattered on the younger branches and ramuli; ternate granules imbedded in the enlarged ramuli. Annual. Fructification in the summer; the granular form appears to be the more frequent.

Pale red or flesh-colour, passing into brownish or olive. It shrinks considerably in drying, and adheres but slightly to paper.

GENUS DCXXXVIII. CHYLOCLADIA. *Chylocladia.*

GEN. CHAR. *Frond* cylindrical, filiform, between gelatinous and cartilaginous, of a pinky-red colour. *Fructification* of two kinds: spherical, ovate, or conical thecæ, containing

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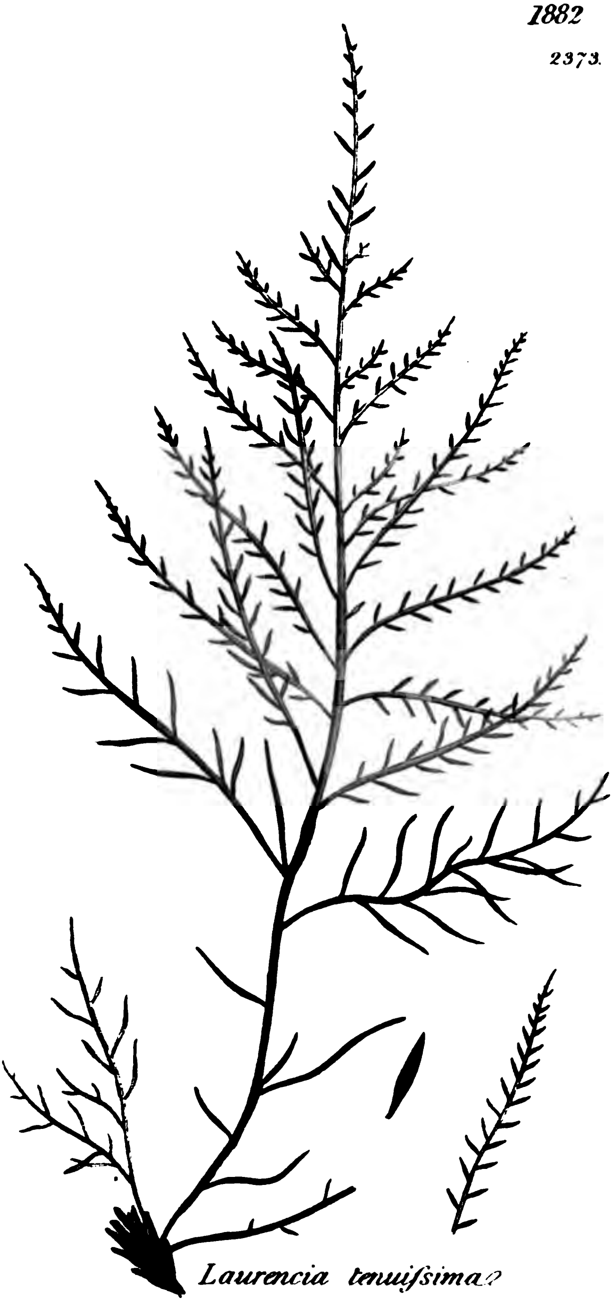
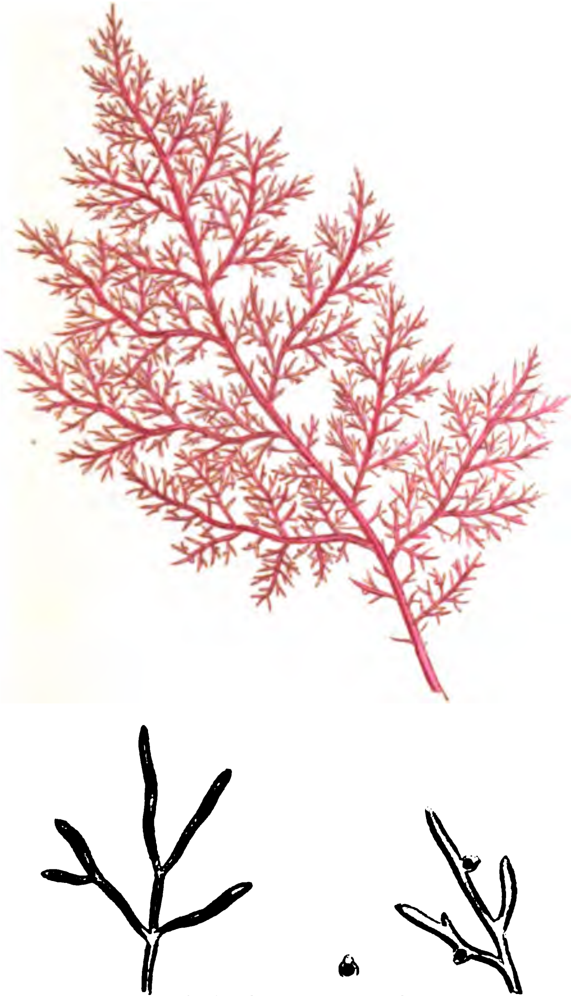
2373.



Laurencia tenuiſsima.?

May 1.1808. Publish'd by Jas. Sowerby London.



Chylocladia clavellosa ?

Aug. 1 1803. Published by Jas. Sowerby. London

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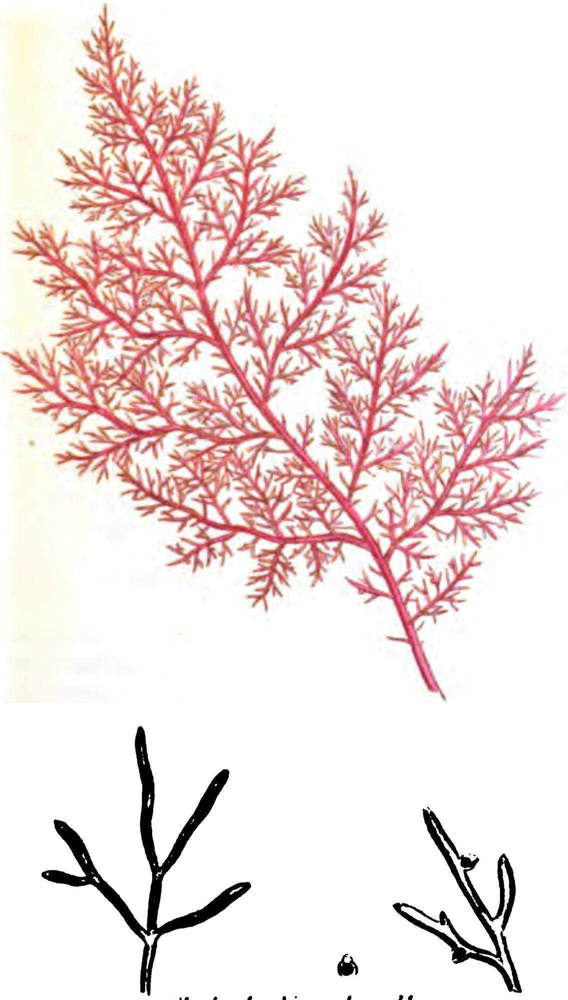


Chylocladia clavellosa ?

Augt 1 1803. Publiſhed by Jas Sowerby London

wedge-shaped or angular sporules; or imbedded ternate granules in distinct plants.

The frond is often constricted at intervals, as if jointed, and there is considerable difference in the structure of the thecæ in different species, rendering the genus very indefinite. The chief distinction between it and the preceding consists in the habit of the plants, which is not very striking, unless in those of the third section, to which the constriction of the frond gives a peculiar character. The thecæ of *Laurencia* discharge their sporules through a terminal pore, but a similar opening is present in those of some *Chylocladiæ*, though in others these organs are imperforate, and invested with a pellucid case like those of *Gigartina*. The difference in the form of the sporules in the three genera is an important, though not a very obvious feature of distinction: in *Laurencia* they are pyriform, and so much attenuated at the base as to appear stalked; in *Chylocladia* they are always more or less angular, sometimes sufficiently attenuated at the point of attachment to become wedge-shaped, but never pyriform; in *Gigartina* they are always oblong or roundish. Under the granular form of fructification, the first two genera are scarcely distinguishable, the granules in both being always ternate, and similarly disposed in the substance of the ramuli; but in *Gigartina* they are simple, or at least never ternate.

The name, from χυλὸς, *juice*, and κλάδος, *a branch*, alluding to the succulent texture of the growing frond, has been substituted for that of *Gastridium*, previously bestowed by Lyngbye, the latter name having been before given to a genus of Grasses.

The fronds are annual: they are of a bright red or pinky-orange colour, altering but little by careful drying. Six, or perhaps eight known species are referable to the genus. They adhere to paper, but not very closely.

* *Frond without constrictions.*

CHYLOCLADIA CLAVELLOSA. *Clavellated Chylocladia.* TAB. **2374.**

Frond subgelatinous, much-branched; branches repeatedly pinnate, distichous, alternate; ultimate ramuli more or less lanceolate, attenuated at the base. Thecæ conical, opening by a pore.

Fucus clavellosus, *Turner in Linn. Trans.* 6. 133. *tab.* 9; *Hist. Fuc. tab.* 30. *E. B.* 1203. Chylocladia clavellosa, *Greville in Hooker Crypt. Part* 1. 297. Gastridium clavellosum, *Lyngbye Hydroph. Dan.* 70. *tab.* 17. *Grev. Alg. Brit.* 115. Chondria clavellosa, *Agardh Spec. Alg.* 1. 353. *Grev. Fl. Edin. Sprengel.* Gigartina clavellosa, *Lamouroux.*

Not unfrequent on the coasts of Great Britain and Ireland. Frond from a minute disc, three or four inches to a foot in height, pink or red, sometimes very pale or greenish-white when it has been exposed to the sun, repeatedly and alternately branched in a pinnate manner; the ultimate ramuli sublanceolate, more or less attenuated at the base, distichous. Thecæ chiefly on the ultimate ramuli, somewhat conical, with a terminal pore: sporules angular, red. Granules in distinct plants, imbedded in the mostly swollen ramuli. Fructification in the latter part of the summer.

"Mr. Harvey finds an appearance of joints in the ultimate ramuli, very evident when fresh."—*Hooker.*

β. sedifolia; ramuli between oblong and ovate, crowded, undivided. *Turner.* Gastridium purpurascens, *Lyngbye Hydroph. Dan.* 69. *tab.* 17.

** *Ramuli elliptical, rarely somewhat elongated and constricted.*

CHYLOCLADIA OVALIS. *Oval-leaved Chylocladia.* TAB. 2375.

Frond subcartilaginous, dichotomously branched; branches naked below, above thickly set with elliptical, simple ramuli, tapering at the base. Thecæ spherical, with a pellucid border.

Fucus ovalis, *Hudson. E. B.* 711. *Turner Hist. Fuc. tab.* 81. Chylocladia ovalis, *Hooker Crypt. Part* 1. 297. Gastridium ovale, *Greville Alg. Brit.* 116. *tab.* 14. Chondria ovalis, *Agardh Spec. Alg.* 1. 348. *Sprengel.* Gigartina vermicularis et ovata, *Lamouroux.* Fucus sedoides, *Goodenough and Woodward in Linn. Trans.* 3. 117.

Frequent on most parts of our coast, growing upon rocks or attached to the stems of the larger *Fuci* and *Laminariæ.* Fronds solitary or in clusters, three inches to a span in height, subdichotomously branched, naked below; the extremities all thickly clustered with subgelatinous, elliptical, leaf-like ramuli, more or less obtuse at the apex and attenuated at the base, and, in some plants, containing the ternate granules imbedded in their substance, in others, supporting the minute globular thecæ. Although generally simple, the ramuli, as observed by Dr. Greville, are in some specimens elongated to half an inch or more, constricted three or four times, and occasionally furnished with a few minute branchlets at the constrictions, somewhat like *C. kaliformis.* Fructification in the summer; the two kinds, as in the *Florideæ* generally, always on separate plants.

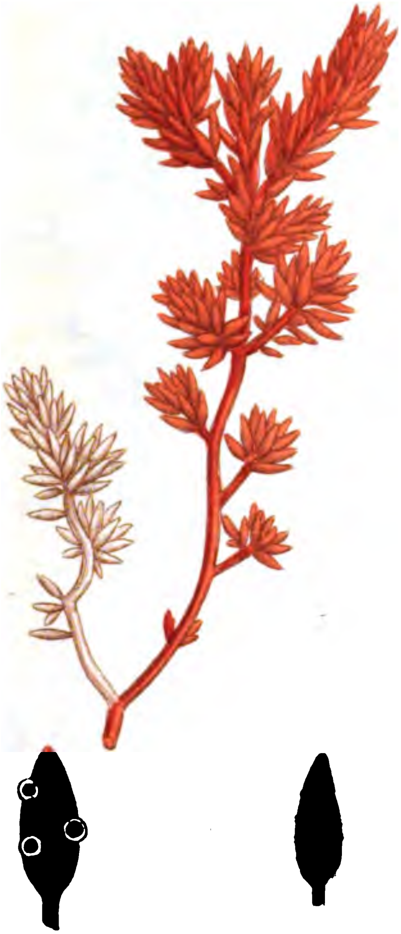
*** *Frond constricted as if jointed.*

CHYLOCLADIA KALIFORMIS. *Salt-wort Chylocladia.* TAB. 2376.

Frond subgelatinous, tubular, constricted at intervals, much-branched; branches from the constrictions, often whorled. Thecæ spherical, with a pellucid border.

Fucus kaliformis, *Goodenough and Woodward in Linn. Trans.* 3. 206. *tab.* 18. *E. B.* 640. *Turner Hist. Fuc. tab.* 29. Chylocladia ka-

Pl.
2375.



Chylocladia ovalis.

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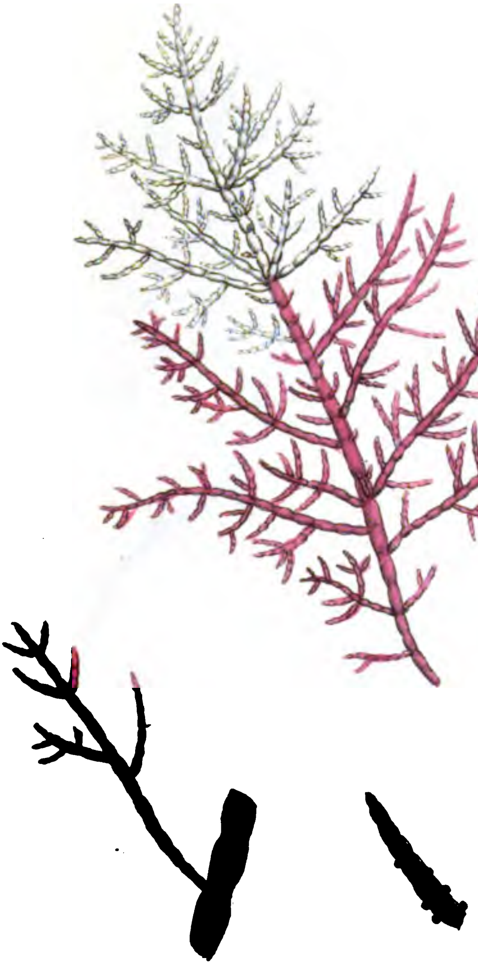
640

2376.



Chylocladia kaliformis.

Sep.r 1. 1799. Published by J. Sowerby London.

1574

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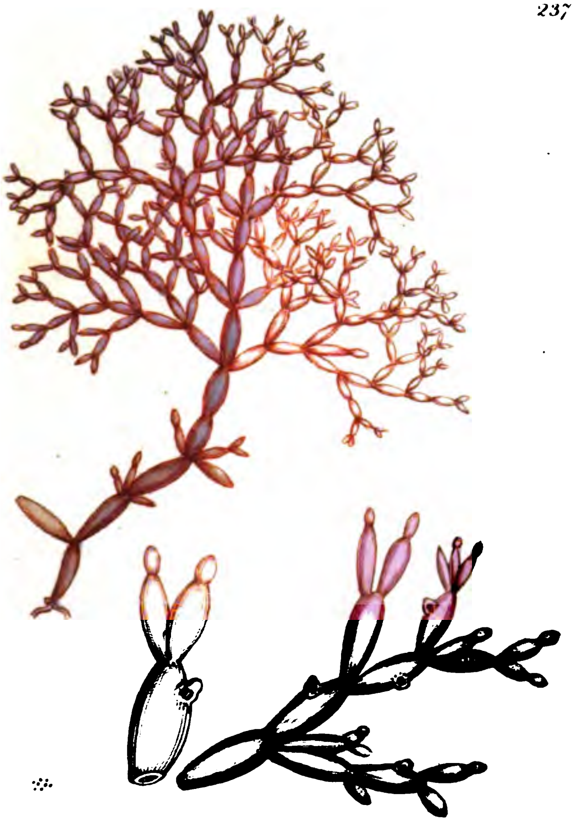


Chylocladia articulata?

March 1. 1806 Published by Jas. Sowerby, London.

liformis, *Hooker Crypt. Part* 1. 297. Gastridium kaliforme, *Lyngbye. Greville Alg. Brit.* 117. Chondria kaliformis, *Agardh Spec. Alg.* 1. 355. *Sprengel.* Gigartina kaliformis, *Lamouroux.*

Found, like the preceding species, on most parts of our coasts, and under similar circumstances. Fronds attached by a minute disc sometimes furnished with a few creeping fibres, six inches to a foot or more in height, much and repeatedly branched, cylindrical, constricted at intervals as if jointed, tubular, tender, almost gelatinous, of a pale, transparent reddish-pink or flesh-colour: branches all springing from the constrictions, the primary ones developing irregularly, the secondary divisions and ramuli being almost universally opposite or whorled. Thecæ minute, spherical, sessile on the ultimate branches or ramuli; ternate granules imbedded in the more or less enlarged ramuli, never on the same individuals with the thecæ. Fructification in the latter part of the summer.

The substance of the frond is so delicate in some specimens, that when dried, and adhering firmly to paper, they appear like a thin coating of pale-coloured varnish, speckled with the dark red prominent thecæ.

CHYLOCLADIA PARVULA. *Least Chylocladia.*

"Frond with scattered, entangled branches, the constrictions nearly equal in length and breadth. Thecæ ovate, containing a spherical mass of wedge-shaped sporules."—*Greville.*

Chylocladia parvula, *Hooker Crypt. Part* 1. 298. Gastridium parvulum, *Greville Alg. Brit.* 119. Chondria parvula, *Agardh Spec. Alg.* 1. 207. *Grev. Crypt. Fl.* 6. *tab.* 346. Fucus kaliformis, γ. nana, *Turner Hist. Fuc.* 1. 67.

Epiphytic on the larger Algæ on the southern coast of England. Fronds only two or three inches long. Distinguished from *C. kaliformis*, according to Dr. Greville, by the constrictions of the frond being accompanied by internal septa, and the thecæ ovate and destitute of a pellucid border: he observes that the entangled branches seem to grow here and there into each other, but the same occurs occasionally in the last species.

I have only seen this in the dried state, in which the difference between it and the preceding is not very obvious.

CHYLOCLADIA ARTICULATA. *Articulated Chylocladia.* TAB. 2377.

Frond tubular, very regularly constricted throughout, repeatedly branched; branches from the constrictions, dichotomous or whorled. Thecæ suburceolate, opening by a pore.

Fucus articulatus, *Lightfoot. E. B.* 1574. *Turner Hist. Fuc. tab.* 106. Chylocladia articulata, *Hooker Crypt. Part* 1. 298. Gastridium articulatum, *Greville Alg. Brit.* 120. Chondria articulata, *Agardh Spec. Alg.* 1. 357. *Sprengel.* Lomentaria articulata, *Lyngbye Hydroph. Dan.* 101. *tab.* 30. Gigartina articulata, *Lamouroux.*

Not unfrequent on rocks and epiphytic on Algæ of the Fucoid tribe on almost every part of the coast. The fronds grow in tufts

liformis, *Hooker Crypt. Part* 1. 297. Gastridium kaliforme, *Lyngbye. Greville Alg. Brit.* 117. Chondria kaliformis, *Agardh Spec. Alg.* 1. 355. *Sprengel.* Gigartina kaliformis, *Lamouroux.*

Found, like the preceding species, on most parts of our coasts, and under similar circumstances. Fronds attached by a minute disc sometimes furnished with a few creeping fibres, six inches to a foot or more in height, much and repeatedly branched, cylindrical, constricted at intervals as if jointed, tubular, tender, almost gelatinous, of a pale, transparent reddish-pink or flesh-colour: branches all springing from the constrictions, the primary ones developing irregularly, the secondary divisions and ramuli being almost universally opposite or whorled. Thecæ minute, spherical, sessile on the ultimate branches or ramuli; ternate granules imbedded in the more or less enlarged ramuli, never on the same individuals with the thecæ. Fructification in the latter part of the summer.

The substance of the frond is so delicate in some specimens, that when dried, and adhering firmly to paper, they appear like a thin coating of pale-coloured varnish, speckled with the dark red prominent thecæ.

CHYLOCLADIA PARVULA. *Least Chylocladia.*

"Frond with scattered, entangled branches, the constrictions nearly equal in length and breadth. Thecæ ovate, containing a spherical mass of wedge-shaped sporules."—*Greville.*

Chylocladia parvula, *Hooker Crypt. Part* 1. 298. Gastridium parvulum, *Greville Alg. Brit.* 119. Chondria parvula, *Agardh Spec. Alg.* 1. 207. *Grev. Crypt. Fl.* 6. *tab.* 346. Fucus kaliformis, γ. nana, *Turner Hist. Fuc.* 1. 67.

Epiphytic on the larger Algæ on the southern coast of England. Fronds only two or three inches long. Distinguished from *C. kaliformis*, according to Dr. Greville, by the constrictions of the frond being accompanied by internal septa, and the thecæ ovate and destitute of a pellucid border: he observes that the entangled branches seem to grow here and there into each other, but the same occurs occasionally in the last species.

I have only seen this in the dried state, in which the difference between it and the preceding is not very obvious.

CHYLOCLADIA ARTICULATA. *Articulated Chylocladia.* TAB. 2377.

Frond tubular, very regularly constricted throughout, repeatedly branched; branches from the constrictions, dichotomous or whorled. Thecæ suburceolate, opening by a pore.

Fucus articulatus, *Lightfoot. E. B.* 1574. *Turner Hist. Fuc. tab.* 106. Chylocladia articulata, *Hooker Crypt. Part* 1. 298. Gastridium articulatum, *Greville Alg. Brit.* 120. Chondria articulata, *Agardh Spec. Alg.* 1. 357. *Sprengel.* Lomentaria articulata, *Lyngbye Hydroph. Dan.* 101. *tab.* 30. Gigartina articulata, *Lamouroux.*

Not unfrequent on rocks and epiphytic on Algæ of the Fucoid tribe on almost every part of the coast. The fronds grow in tufts from a creeping fibrous base, rising from one to six inches in height; they are of a tender, subgelatinous substance, and purplish or pinky-red colour, variously and repeatedly branched, tubular, constricted at very regular intervals throughout, as if jointed, the apparently articulated portions being elliptical, and resembling in arrangement the beads of a necklace; branches dichotomous, subfastigiate or whorled. Thecæ minute, suburceolate or obtusely conical, opening by a terminal pore, containing a conical mass of red angular sporules, scattered on the ultimate branches. Ternate granules imbedded in the somewhat enlarged ramuli, on separate plants. Fructification throughout the summer.

The several species above described are considered by our algologists to be only of annual duration, but the minute disc, in all of them, is accompanied by fibres, which creep along the rock or the stem of the supporting plant, fixing themselves here and there, and forming at these points the rudiments of future fronds; the fibres never extend far in any direction, but are crowded into little entangled tufts. These bases in *C. kaliformis* and *C. articulata* are undoubtedly perennial, although the fronds, as in many other marine plants of delicate texture, similarly circumstanced, are annual.

GENUS DCXXXIX. GIGARTINA. *Gigartina.*

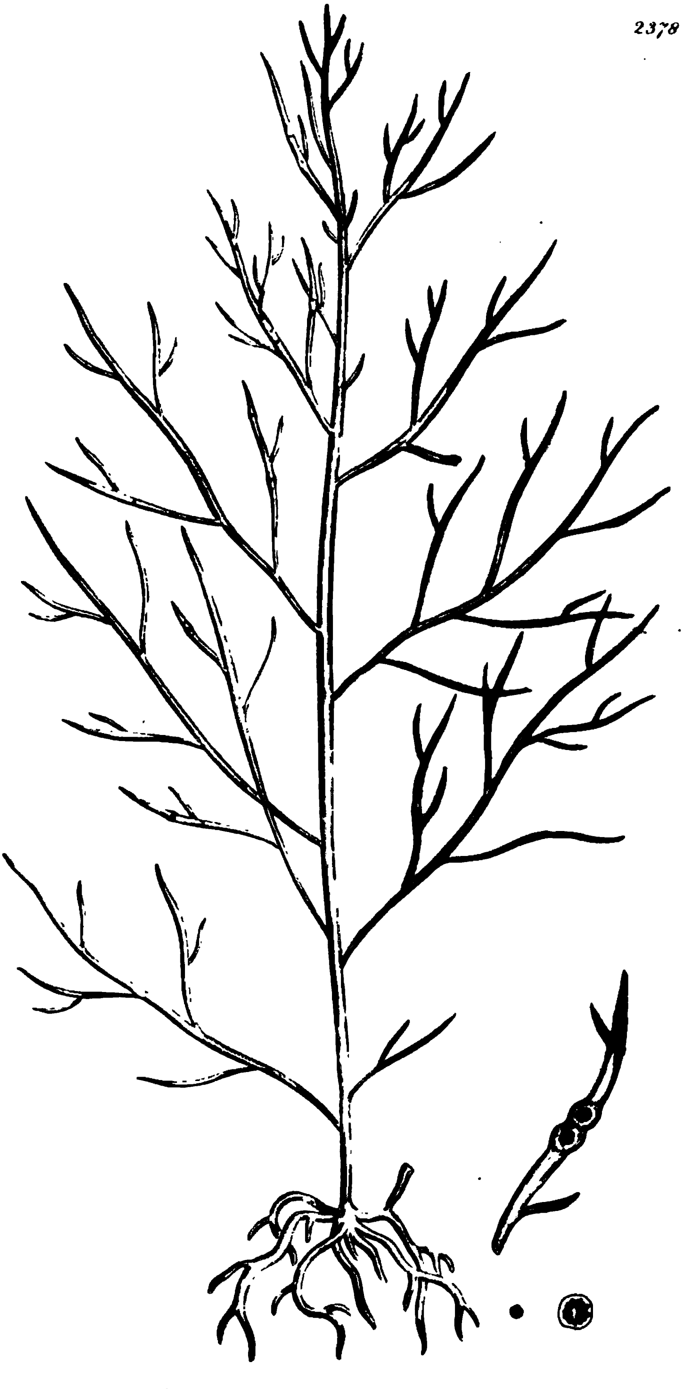
GEN. CHAR. *Frond* corneous or cartilaginous, filiform, cylindrical or compressed, irregularly branched, dull red or purplish. *Fructification*: sessile or immersed spherical thecæ, containing a mass of minute roundish sporules; or roundish or oblong, simple granules, imbedded in the frond, always in distinct plants.

Under this genus, established by Lamouroux, the *Gigartinæ* and *Gracilariæ* of Dr. Greville are united by Sir W. J. Hooker, as indeed they previously were by Lamouroux, the only real distinction between them consisting in the supposed absence of the granular form of fructification in the former plants; a negative character, the value of which has been weakened, if not altogether set aside, by the discovery of granuliferous specimens of *Gigartina acicularis* by Mrs. Griffiths. About thirty known species are referable to the above type. The name, from *γίγαρτον, a grape-stone*, bears a distant allusion to the appearance of the mass of sporules, as seen through the semitransparent theca of some of the species.

In several species of *Gigartina* no normal form of fructification has been observed; this is the case with the British *G. Griffithsiæ* and *G. plicata*, in which wart-like excrescences, composed of vertical, parallel, moniliform or articulated filaments, and styled by Agardh *nemathecia*, seem to supply the place of thecæ in the propagation of the plants.

1243

2378



Gigartina purpurascens.

Decr 1 1803 Published by Jas Sowerby London

Some of the exotic *Gigartinæ* are applied to economical purposes. *G. helminthocorton*, a Mediterranean species, has long been celebrated for its vermifugal qualities, and has likewise been recommended as a remedy for cancer: on some parts of the continent its medicinal effects are in high esteem, and though little, if ever, employed in this country by the regular practitioner, it is to be met with occasionally in the shops of the druggist and herbalist under the names of Corsican Moss, or Corsican Coralline. *G. lichenoides*, the Ceylon Moss, is a highly important plant to the inhabitants of the Indian Archipelago, being collected in large quantities for food; it has of late years been imported into England, and recommended as a substitute for animal jelly, forming by boiling a substance of similar character, equally nutritious, and less liable to liquefy and spoil by keeping. *G. tenax* is employed in China and Japan as a substitute for glue and gum: Mr. Turner states that about 27,000 lbs. of it are annually imported at Canton, where it sells at sixpence or eightpence per pound; the Chinese use it in the preparation of varnish for their paper-lanterns, and for stiffening and glazing silks and gauzes: Mr. Niell considers it "probable that this is the principal ingredient in the celebrated gummy matter called Chin-chou, or Hai-tsai, in China and Japan. Windows, made merely of slips of bamboo, crossed diagonally, have frequently their lozenge-shaped interstices wholly filled with the transparent glue of Hai-tsai."

One of our native species, *G. compressa*, approaches so near in general characters to *G. lichenoides*, that Dr. Greville at first regarded it as the same, and informs us that "Mrs. Griffiths," under a like impression, "among other experiments, made a pickle and a preserve from fresh specimens, and in both cases it proved excellent."

GIGARTINA PURPURASCENS. *Purplish Gigartina.* TAB. **2378.**

Frond cylindrical, filiform, much and irregularly branched: ramuli setaceous, attenuated at each extremity, scattered; bearing the spherical thecæ immersed in their substance.

Fucus purpurascens, *Hudson. E. B.* 1243. *Velley tab.* 2. *fig.* 2. *Turner Hist. Fuc. tab.* 9. Gigartina purpurascens, *Lamouroux. Hooker Crypt. Part* 1. 299. Gracilaria purpurascens, *Greville Alg. Brit.* 122. Sphærococcus purpurascens, *Agardh Spec. Alg.* 1. 318. *Sprengel.* Fucus tuberculatus, *Lightfoot.*

Frequent, growing upon rocks, or attached to other Algæ, on almost every part of the coast. Frond fixed by numerous, root-like clasping fibres, from a span to one or two feet long, filiform, generally with a simple stem, bearing many compound branches tapering to each extremity, the ultimate ones very slender and acute. Thecæ spherical, tubercle-like, immersed in the substance of the ramuli:

granules roundish-ovate, imbedded in the ramuli, invested with a pellucid border. Annual? Fructification in the summer.

A variable species, of a somewhat gelatinous substance in the recent state, and of a more or less pale, reddish- or greenish-brown hue. It adheres slightly to paper in drying.

The branches often terminate in a kind of tendrils, which twist round the Algæ in their vicinity.

There is seldom more than a single theca, or at most two, developed in each ramulus, almost always about the middle of it, causing a swollen appearance very characteristic of the species.

GIGARTINA CONFERVOIDES. *Conferva-like Gigartina.* TAB. **2379.**

Frond cartilaginous, cylindrical, filiform, irregularly branched: branches elongated, bearing scattered, setaceous ramuli, attenuated at each end. Thecæ external, scattered, roundish, with a prominent orifice.

Fucus confervoides, *Linn.* *E. B.* 1668. *Turner Hist. Fuc. tab.* 84. Gigartina confervoides, *Lamouroux.* *Hooker Crypt. Part* 1. 299. Gracilaria confervoides, *Greville Alg. Brit.* 123. Sphærococcus confervoides, *Agardh Spec. Alg.* 1. 303. *Sprengel.* Fucus verrucosus, *Hudson.* *Stackhouse Ner. Brit.* 26. *tab.* 8. F. gracilis, *Stackhouse Ner. Brit.* 100. *tab.* 16.

Frequent on the southern coasts of England and Ireland; in the North comparatively rare. Fronds clustered, from a small, flattish, hard disc, from a few inches to a foot or more in length, of a firm, cartilaginous substance, and purplish-brown or dark red colour, varying to greenish, and of the thickness of small pack-thread; branches irregular, partially secund, all tapering upwards, and slightly contracted at the base. Thecæ roundish or hemispherical, with a papillary, projecting orifice, sessile, scattered indiscriminately over the frond: granules minute, ovate, imbedded, chiefly in the ultimate branches. Perennial. Fructification during the greater part of the year.

Very diversified in its aspect, as the following varieties indicate:—

β. procerrima. Branches very long, generally simple and almost naked.—*Turner.* Fucus longissimus, *Stackhouse Ner. Brit.* 99. *tab.* 16.

γ. albida. Frond compressed, mostly dichotomous, ramuli subulate.—*Turner.* Fucus albidus, *Hudson.*

δ. geniculata. Frond distorted and bent as if broken at the tubercles. —*Turner.*

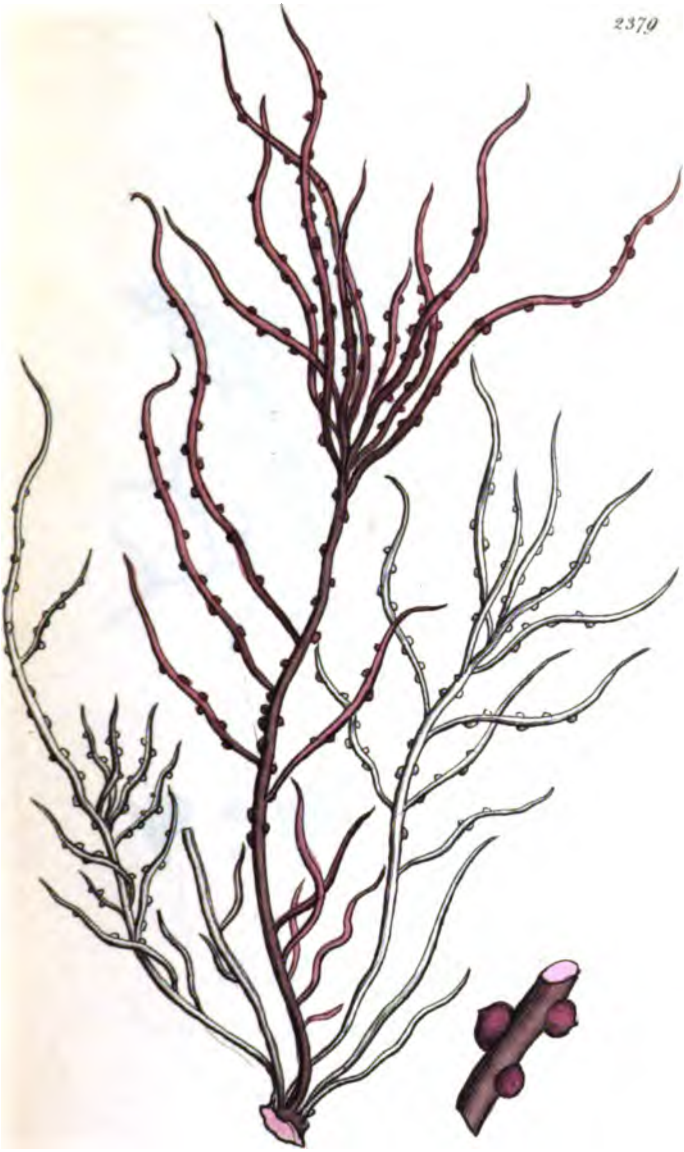
GIGARTINA COMPRESSA. *Compressed Gigartina.*

"Frond cartilaginous, brittle, between cylindrical and compressed, dichotomous; branches subdistichous, spreading, lax, gradually attenuated to a subulate point. Thecæ hemispherical."—*Greville.*

Gigartina compressa, *Hooker Crypt. Part* 1. 299. Gracilaria compressa, *Greville Alg. Brit.* 125. Sphærococcus compressus, *Agardh Spec. Alg.* 1. 308. *Sprengel.* S. lichenoides, *Greville Crypt. Fl.* 6. *tab.* 341.

1668

2379

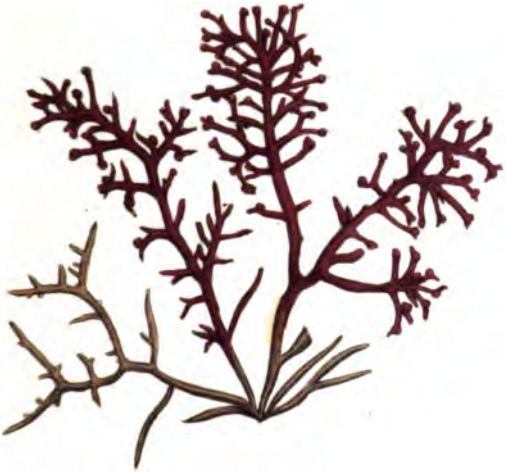


Gigartina confervoides.

Nov.r 1.1806. Publish'd by Ja.s Sowerby, London.

908

2380



Gigartina pistillata.

Augt 1 1801. Published by Jas Sowerby London.

Hitherto only met with on the sea-shore at Sidmouth and parts adjacent, where it was first found by Mrs. Griffiths. Fronds from four inches to a foot in length; when fresh succulent and very brittle, so as scarcely to support their own weight, shrinking very much in drying, and then becoming tough. Colour dull red. Thecæ sessile, on various parts of the frond, hemispherical, with a prominent orifice: granules ovate, reddish, imbedded in the branches. Fructification in August.

"To me, its nearest affinity (exclusive of the fructification) appears to be with *G. purpurascens*: it is nearly of the same colour and texture, but stouter."—*Hooker*.

GIGARTINA ERECTA. *Small upright Gigartina.*

"Frond cylindrical, dichotomous, erect: branches subsimple. Thecæ globose: granules in terminal pod-like ramuli."—*Greville.*

Sphærococcus? erectus, *Greville Crypt. Fl.* 6. *tab.* 357. Gracilaria erecta, *Grev. Alg. Brit.* 124. *tab.* 14. Gigartina erecta, *Hooker Crypt. Part* 1. 300.

Discovered by Mrs. Griffiths, growing on flat rocks and half-immersed in sand, at Torbay, Sidmouth, and elsewhere on the coast of Devonshire. Fronds tufted, erect, two to four inches high, cartilaginous, very slender, almost bristle-like, once or twice dichotomous. Thecæ globose, scattered on the nearly erect, ultimate branches or ramuli: granules imbedded in lanceolate, pod-like, mostly terminal, subgelatinous receptacles. Perennial. Fructification in the early part of the spring.

A very pretty and certainly distinct species, of a bright pink colour.

GIGARTINA PISTILLATA. *Pestle-bearing Gigartina.* TAB. 2380.

Frond corneous, linear, compressed or subcylindrical, subdichotomously branched: branches set with distichous, horizontal, short, subulate ramuli. Thecæ near the extremities of the ramuli.

Fucus gigartinus, *Linn. E. B.* 908. *Turner Hist. Fuc. tab.* 28. Gigartina pistillata, *Lamouroux. Greville Alg. Brit.* 146. *Hooker Crypt. Part* 1. 300. Fucus pistillatus, *Gmelin.*

One of the rarest of the British Algæ. Found on rocks on the coast of Cornwall, at Padstow and in Mount's Bay. Fronds tufted, three to six inches high, filiform, somewhat compressed, very rigid, horny, purplish-red, more or less branched in a subdichotomous manner; the branches set with nearly distichous, subulate ramuli, bearing the sessile, globose thecæ near the extremity, the only form of fructification hitherto observed on this species: the sporules are ejected through a terminal pore, and Dr. Greville remarks that they differ from those of all other *Florideæ* in being collected into little, distinct, ovate parcels. Perennial. Fructification in the spring.

From being only met with at the south-west extremity of our island, it appears to be a native of the warmer parts of the Atlantic; the specimens in the Linnæan herbarium were gathered by Loefling at St. Ubes, in Portugal.

GIGARTINA ACICULARIS. *Sharp-pointed Gigartina.* TAB. 2381.

Frond cartilaginous, cylindrical, filiform, subdichotomous: branches divaricated, somewhat pinnated with spreading, acuminated ramuli. Thecæ spherical, sessile, scattered.

Fucus acicularis, *Wulfen. Turner Hist. Fuc. tab.* 126. *E. B.* 2190. Gigartina acicularis, *Lamouroux. Greville Alg. Brit.* 147. *tab.* 16. *Hooker Crypt. Part* 1.300. Sphærococcus acicularis, *Agardh Spec. Alg.* 1.322.

A native of rocks on the coast of Cornwall and Devonshire, and occasionally cast ashore elsewhere in stormy weather; it may however be accounted one of our rarest species. Fronds tufted, from a minute leather-like disc, two to four inches in length, purplish-red, more or less spreading, irregularly dichotomous; the branches set with pinnated, occasionally unilateral, patent, acuminated ramuli, which often bear here and there a few spine-like processes. Thecæ scattered on the ultimate ramuli, globular, sessile. Scattered granules, imbedded in the ramuli, have been discovered in some specimens by Mrs. Griffiths. Perennial. Fructification in the winter.

It has a tendency to creep by means of its lower branches, as observed by Mr. Turner. In a specimen before me two lateral ramuli are dilated at the extremity into a small circular disc; hence it is probable that they fix themselves wherever they come in contact with the rock.

GIGARTINA TEEDII. *Teede's Gigartina.*

Frond subcartilaginous, linear-acuminated, flat, repeatedly and irregularly pinnated with very narrow, horizontal branches; the ultimate ramuli setaceous, bearing the spherical thecæ.

Gigartina Teedii, *Lamouroux. Hooker Crypt. Part* 1.301. Sphærococcus Teedii, *Agardh Spec. Alg.* 1. 277. *Greville Crypt. Fl. tab.* 356. *Sprengel.* Rhodomenia Teedii, *Grev. Alg. Brit.* 96. Fucus Teedii, *Roth. Turner Hist. Fuc. tab.* 208.

Found by Mrs. Griffiths, who first noticed it as a British species, in Lupton and Elberry Coves and on Tor-Abbey rocks, Torbay. A very beautiful species of a purplish-red colour, sometimes variegated with green and pale pink. Fronds tufted, two to five inches long, much and repeatedly branched and pinnated from the very base. Neither thecæ nor granules have yet been discovered on British specimens. Perennial.

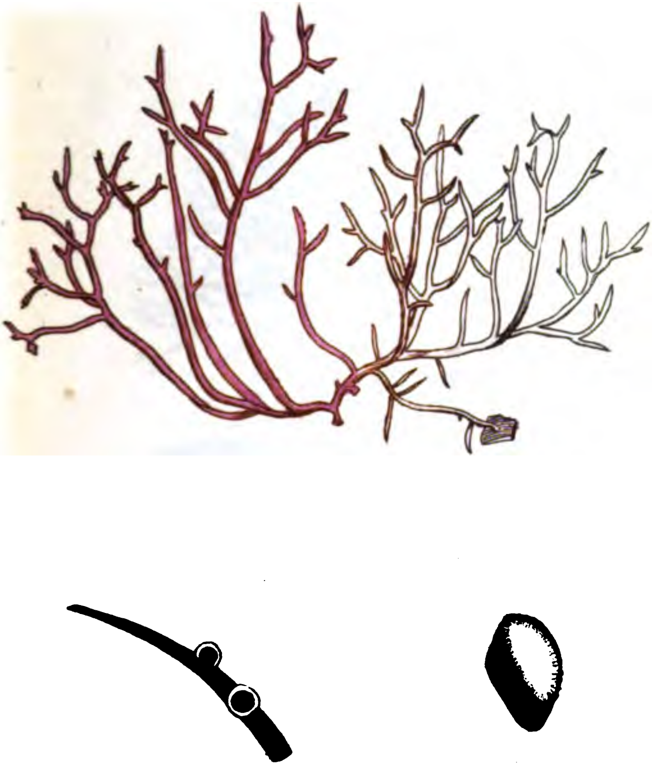
GIGARTINA GRIFFITHSIÆ. *Mrs. Griffiths's Gigartina.* TAB. 2382.

Frond between corneous and cartilaginous, cylindrical, filiform, dichotomous, fastigiate. Fructification? oblong warts (*nemathecia*) surrounding the branches of the frond.

Fucus Griffithsiæ, *Turner Hist. Fuc. tab.* 37. *E. B.* 1926. Gigartina Griffithsiæ, *Greville Alg. Brit.* 149. *Hooker Crypt. Part* 1. 301. Sphærococcus Griffithsiæ, *Agardh Spec. Alg.* 1.316. *Sprengel.* Polyides Griffithsiæ, *Gaillon.*

2190

2381.

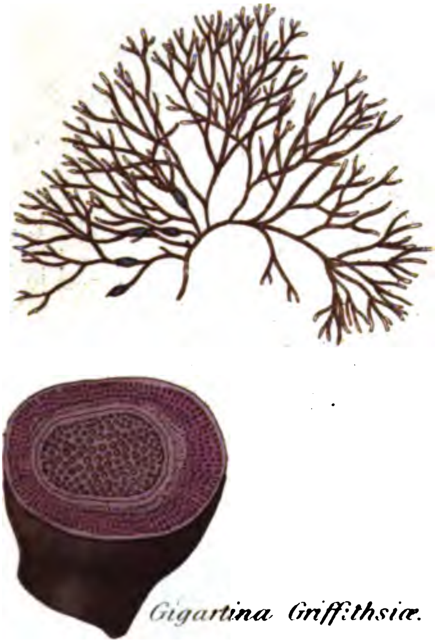


Gigartina acicularis.

[illegible] published by Js. Sowerby London

1926

2382

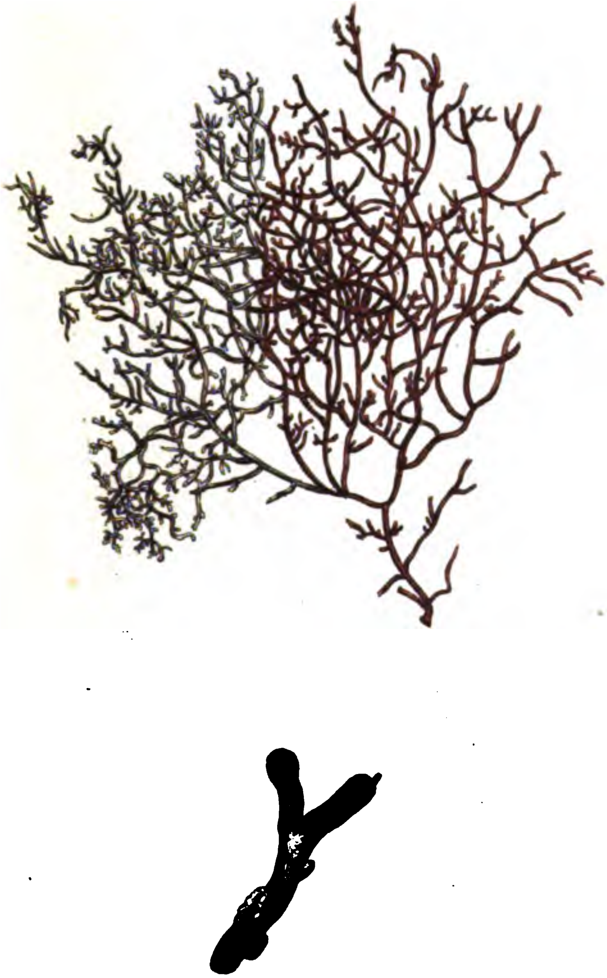


Gigartina Griffithsiæ.

Sept. 1. 1808. Publish'd by Jas. Sowerby, London.

1089

2383.



Gigartina plicata?

Novr 1. 1802 Published by Jas Sowerby, London

Attached to rocks near Sidmouth, Exmouth, and other places on the extreme southern coast of England; found likewise near Dublin. Fronds tufted, from a minute scutate base, one to four inches high, of a more or less dark purplish colour, many times branched in a dichotomous manner; the branches all nearly of the same thickness, very slender, filiform, divaricated, rising nearly to the same height, their summits sometimes thickened and compressed. The only appearance of fructification hitherto observed is very equivocal, being in the form of elliptical warts, or *nemathecia*, investing the branches here and there, which, when cut transversely and examined with a magnifier, are found to consist of numerous radiating, articulated, moniliform filaments, as shown in the section on our Plate. Perennial?

GIGARTINA PLICATA. *Entangled Gigartina.* TAB. **2383.**

Frond corneous, rigid, cylindrical, filiform, equal, irregularly branched; branches entangled, set with numerous, mostly secund, ramuli. Fructification? oblong, irregular warts (*nemathecia*).

Fucus plicatus, *Hudson*. *E. B.* 1089. *Turner Hist. Fuc. tab.* 180. Gigartina plicata, *Lamouroux*. *Greville Alg. Brit.* 150. *Hooker Crypt. Part* 1. 301. Sphærococcus plicatus, *Agardh Spec. Alg.* 1. 313. *Sprengel.* Scytosiphon Hippuroides, *Lyngbye Hydroph. Dan.* 63. *tab.* 14.

Very common on all the rocky parts of our coast. The matted, wiry fronds grow in tufts from a minute scutate base, varying in length from three or four inches to a span, and in colour from a deep brownish-purple to pale pink, yellow, or waxy-white: branches numerous, irregular, set with horizontal, obtuse ramuli, mostly pointing in one direction, and occasionally again divided; all the divisions filiform, and nearly of an equal thickness throughout. No other appearance of fructification has been found upon the species, except oblong, irregular warts, or *nemathecia*, composed of obscurely articulated filaments, and sometimes investing the branch completely, as in the preceding species. Perennial.

GENUS DCXL. CHONDRUS. *Chondrus.*

GEN. CHAR. *Frond* cartilaginous, dilating upwards into flat, veinless, dichotomously divided segments; of a purplish or livid colour. *Fructification*: subspherical thecæ, imbedded in the substance of the frond, rarely external and pedicellate or sessile, containing a mass of minute free sporules.

This genus includes about twenty-five known species, characterized by a general resemblance in texture, in the form and divisions of the frond, and, in a degree, by the structure of the fructification. The texture is indicated by the name, from the Greek χόνδρος, *cartilage*. The general outline of the frond is always roundish flabelliform, with dichotomous divisions, the base attenuated more or less into a cylindrical stem or stipes, and fixed by a scutum. In most instances the thecæ are contained in the substance of the dilated portions of the frond, but occasionally form external appendages, pedicellate as in *C. mammillosus* and *C. membranifolius*, or sessile at the extremities of the ultimate segments as in *C. Brodiæi*: sometimes their place is supplied in particular individuals by *nemathecia*.

The plants are perennial. They do not adhere to paper in drying.

CHONDRUS CRISPUS. *Curled Chondrus.* TAB. 2384.

Frond plane, dichotomous; the segments linear wedge-shaped, often curled. Thecæ subhemispherical, imbedded in the disc of the frond.

Fucus crispus, *Linn.* *E. B.* 2285. *Turner Hist. Fuc. tab.* 216–217. Chondrus crispus, *Lyngbye.* *Greville Alg. Brit.* 129. *tab.* 15. *Hooker Crypt. Part* 1. 302. Sphærococcus crispus, *Agardh Spec. Alg.* 1. 256. *Grev. Fl. Edin.* *Sprengel.* Chondrus polymorphus, *Lamouroux.* Fucus ceranaides, *Gmelin.* *Lightfoot.* F. stellatus and lacerus, *Stackhouse.* F. filiformis, *Hudson.* F. patens, *Goodenough and Woodward.*

Very common on all our rocky shores. Fronds tufted, fixed by a hard, scutate base, dull purple, changing to greenish and eventually to a yellowish-white by exposure to the air, from two inches to a span or more in height, dilated variously from a slender, subcylindrical stem, into a repeatedly dichotomous, fan-like head of curled or wavy segments, which are linear or subcuneate, differing greatly in breadth, with entire margins and, generally, notched extremities. Thecæ orbicular or roundish-ovate, subhemispherical, immersed in the substance of the segments, causing a prominence on one side, and mostly a corresponding depression on the other; when ripe they drop out, leaving a cavity. Fructification in the spring.

Our largest figure indicates its perennial character in the successional development of the fronds.

The most diversified in appearance of all the Algæ. The following varieties enumerated by Mr. Turner will convey some idea of the modifications of form to which it is liable, but are not to be regarded as definite, passing as they do by almost imperceptible grades into each other.

β. virens. Frond submembranaceous; branches dilated upwards, flattish, extreme segments long and acuminated.

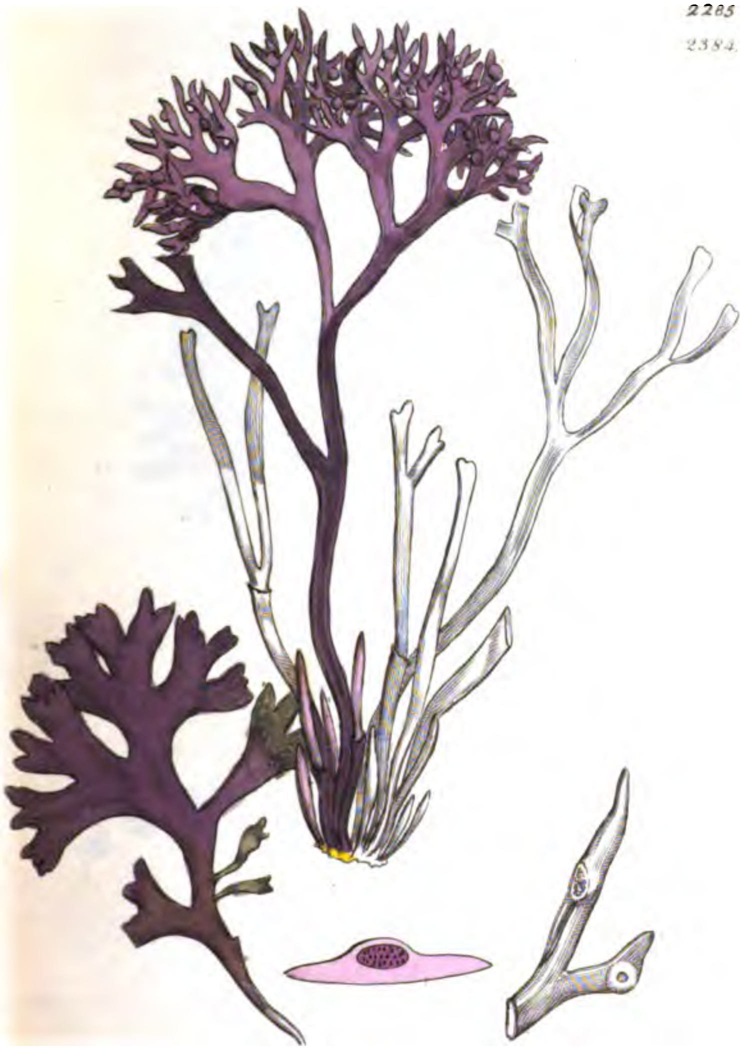
γ. stellatus. Frond submembranaceous; branches dilated upwards, divided at their apices into very numerous, clustered, short laciniæ.

δ. æqualis. Frond cartilaginous, thick; all the branches equal, linear, the extreme segments obtuse.

ε. filiformis. Frond cartilaginous, subcylindrical; branches nearly linear, with long and acuminated apices.

2285

2384.

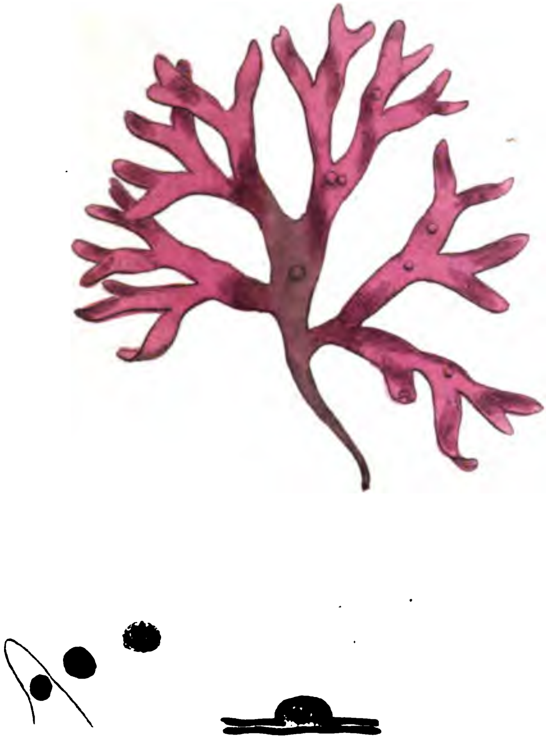


Chondrus crispus.

[illegible] published by Jas. Sowerby London.

1080

2385.



Chondrus norvegicus.

Oct. 1 1802 Publiſhed by Jas Sowerby. London

ζ. **patens.** Frond subcartilaginous, channeled on one side, dichotomous, with patent angles.

η. lacerus. Frond cartilaginous, compressed; apices very narrow, elongated, branched.

θ. Sarniensis. Frond between coriaceous and cartilaginous; branches slightly channeled on one side, dilated upwards, apices rounded and emarginate.

ι. planus. Frond subcoriaceous, flat, wide; branches linear, apices obtuse.

κ. geniculatus. Frond cartilaginous, compressed; branches nearly linear. Thecæ subglobose, black: frond bent, and often broken at the thecæ.

In Ireland this species has long been of economical value, being converted into a kind of size for the use of painters and plasterers. Prepared by frequent washings and bleached by the sun, it is adapted to various purposes as a substitute for isinglass, especially for the manufacture of jellies, blanc-mange, and other culinary productions, nearly the whole weight of the dried plant being convertible by boiling into the required substance. It is likewise employed medicinally in consumptive cases, in lieu of the Iceland Moss, *Cetraria Islandica.* Several years have now elapsed since its introduction into the metropolis, recommended by the qualities in question, and it is now sold by the druggists and herbalists in most towns throughout England, under the names of Carrageen or Irish Moss, by which it was originally imported from the sister kingdom, the Irish peasantry on the southern coast realizing at first 2*s*. per pound by its collection and preparation.

CHONDRUS NORVEGICUS. *Red Norway Chondrus.* TAB. 2385.

Frond plane, dichotomous; the segments linear, entire, rounded at the apex. Thecæ minute, imbedded in the disc of the frond near the summit.

Fucus Norvegicus, *Gunner. Fl. Norv.* 2. 122. *tab.* 3. *fig.* 4. *E. B.* 1080. *Turner Hist. Fuc. tab.* 41. Chondrus Norvegicus, *Lamouroux. Greville Alg. Brit.* 130. Sphærococcus Norvegicus, *Agardh Spec. Alg.* 1. 255. *Sprengel.*

Not unfrequent on the southern coast of England. Fronds two to four inches high, of a deep blood-red-colour, becoming brownish-yellow by exposure to the atmosphere. The thecæ are rarely produced, but dark red nemathecia of a flattish, hemispherical figure, composed of vertical, moniliform filaments, are not uncommon, and have often been regarded as the normal fructification.

Scarcely distinguishable from certain states of *C. crispus*, of which it is probably only one of the almost innumerable varieties. The presence of nemathecia is not a character of sufficient importance to constitute one of specific distinction, and in regard to the frond itself, we have, I fear, nothing beyond its brighter red colour to depend upon in the separation, a feature of small account in this genus.

CHONDRUS MAMMILLOSUS. *Mammillary Chondrus.* TAB. 2386.

Frond somewhat channeled, dichotomous; the segments linear-wedge-shaped. Thecæ spherical or subovate, shortly pedicellate, scattered over the disc of the frond.

Fucus mammillosus, *Goodenough and Woodward in Linn. Trans. Turner Hist. Fuc. tab.* 218. *E. B.* 1054. Chondrus mammillosus, *Greville Alg. Brit.* 127. *Hooker Crypt. Part* 1. 302. Sphærococcus mammillosus, *Agardh Spec. Alg.* 1. 260. *Sprengel.* Fucus polymorphus var. *Lamouroux.* F. echinatus, *Stackhouse.*

Common on all our coasts, attached to rocks and stones. Fronds three inches to a span in height, resembling much in mode of growth and division those of *C. crispus*, but always more or less channeled, excepting towards the extremities, which are flat: in colour they vary from red or pale purple to a purplish-brown or green. The species is most strikingly distinguished by its singular mammillary thecæ, scattered over both sides of the uppermost ramifications, and supported upon little short stalks, each containing a cluster of dark red sporules. Fructification in the winter and early spring.

The frond varies much in the breadth and division of its segments, which are very prone to become proliferous.

CHONDRUS MEMBRANIFOLIUS. *Membranous-leaved Chondrus.* TAB. 2387.

Stipes cylindrical, filiform, branched; the branches expanding into many-cleft, subcuneate, membranaceo-cartilaginous segments. Thecæ ovate, shortly pedicellate, arising from the stem.

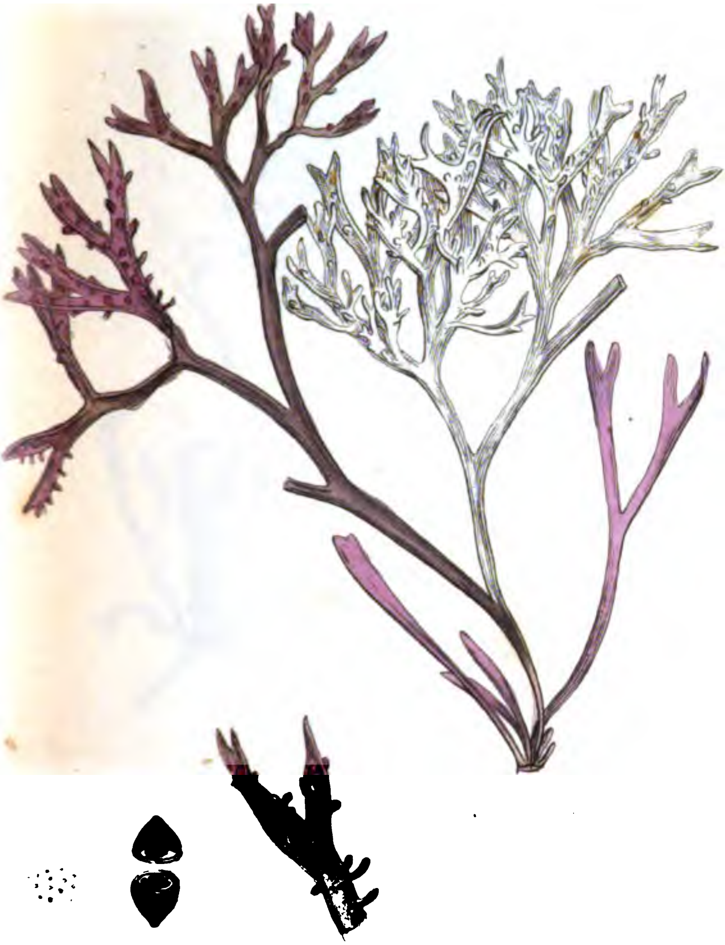
Fucus membranifolius, *Goodenough and Woodward in Linn. Trans. Turner Hist. Fuc. tab.* 74. *E. B.* 1965. Chondrus membranifolius, *Greville Alg. Brit.* 131. *Hooker Crypt. Part* 1. 302. Sphærococcus membranifolius, *Agardh Spec. Alg.* 1. 240. *Sprengel.* Fucus fimbriatus, *Hudson.*

Frequent on rocks on almost every part of the coast. Several fronds of various degrees of development are frequently observed growing from the same small scutate base, which is perennial: they are of a dull brownish-red, changing to greenish, or by farther exposure, to a yellowish-white, from three or four inches to a span in height. Stem cylindrical, sometimes flattened and dilated upwards, of a texture approaching to horny, irregularly, subdichotomously branched, the branches expanding into broadly wedge-shaped, variously cloven, often palmate segments, with obtuse, jagged or fringed extremities. Thecæ ovate, shortly stalked, usually on the upper part of the stem, sometimes on the surface or margin of the segments, containing a globular mass of minute, roundish, red sporules. On some plants, but rarely on those which produce thecæ, nemathecia appear in the form of oblong, dark red, slightly elevated spots, which occur on both sides of the disc of the segments, and consist of dense, articulated fibres. Fructification from October to March.

Almost as variable in its development as *C. crispus.* Several of its forms are enumerated and characterized by Mr. Turner.

1054

2386

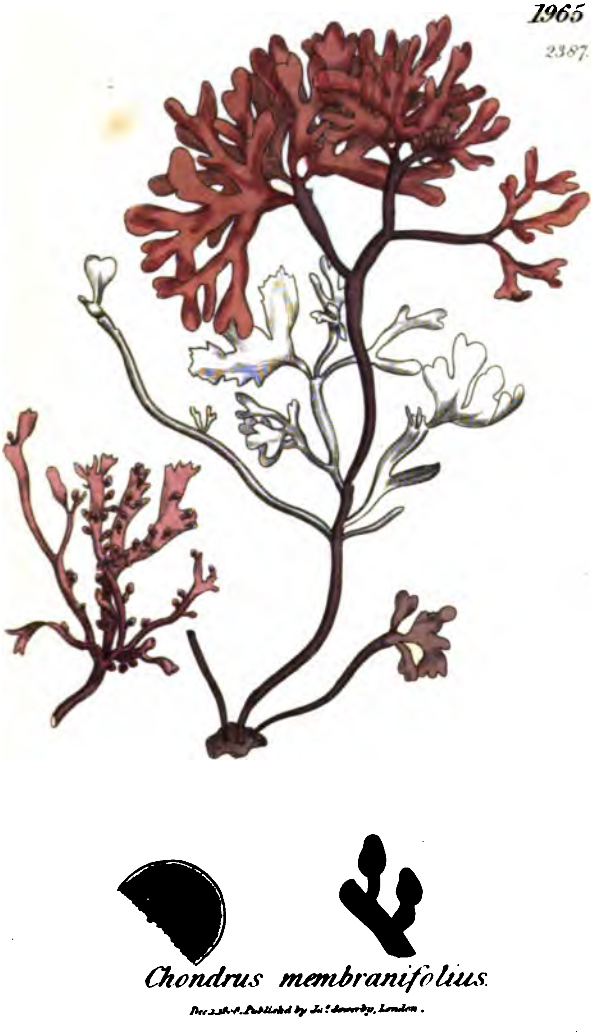


Chondrus mammillosus.

Aug. 1. 1802 Publiſhed by Ja^{s} Sowerby. London.

1965

2387.



Chondrus membranifolius.

Dec. 1. 1808. Published by Jas. Sowerby, London.

β. lacer. Leaves or frondlets dichotomous; segments linear, apices acute.
γ. stellatus. Apices of the leaves cleft into very numerous, narrow segments.
δ. fimbriatus. Leaves fringed at the margin.
ε. latifolius. Leaves membranaceous, semiorbicular, multifid in a palmate manner; segments shortish, rounded at the apices.
ζ. roseus. Stipes simple, expanded at its apex into a single, oblong, simple leaf.
η. angustissimus. Leaves very narrow, nearly linear, irregularly divided, proliferous from the margin.

The variety *roseus* Dr. Greville refers to the next species, *C. Brodiæi*.

CHONDRUS **Brodiæi**. *Mr. Brodie's Chondrus.* Tab. **2388.**

Stipes cylindrical, filiform, subdichotomous, the branches expanding into oblong, membranaceo-cartilaginous, mostly forked segments, proliferous from their marginal extremity. Thecæ spherical, sessile on the apices of the segments.

Fucus Brodiæi, *Turner Hist. Fuc. tab.* 72. *E. B.* 1966. Chondrus Brodiæi, *Greville Alg. Brit.* 133. *Hooker Crypt. Part* 1. 303. Sphærococcus Brodiæi, *Lyngbye. Agardh Spec. Alg.* 1. 239. *Grev. Fl. Edin.* S. membranifolius, var. Brodiæi, *Sprengel.* Delesseria Brodiæi, *Lamouroux.*

Not unfrequent on the east coast of Scotland. Fronds more or less tufted, deep purplish-red, three to six inches high, irregularly dichotomous, the branches gradually dilating into oblong or subcuneate, forked or simple segments, which are often proliferous at the extremity, as are likewise the frondlets or proliferous shoots themselves. Thecæ spherical, dark red, sessile, or rather innate, at the extremities of the segments. Perennial. Fructification in the winter and early spring. Mr. Turner first separated this from *C. membranifolius*, with some varieties of which it agrees nearly in habit; but the fructification is very dissimilar, not only to that of the latter species, but even to its structure throughout the genus; the thecæ so called being in reality destitute of any investing membrane, the outer part consisting of a dense mass of apparently moniliform fibres, similar to those forming nemathecia, radiating from the surface of a globular mass of sporules constituting the centre or nucleus, as shown in our magnified section. Dr. Greville, apparently describing from recent specimens, observes that the exterior of these curious organs is "composed of a thick mass of compound granules in radiating lines, while the centre is occupied by similar granules, only considerably larger and in no arrangement. In the young state the external portion seems to be composed of jointed filaments, but in a ripe theca their real nature is sufficiently perceptible: the granules of this part are roundish, but at the same time angular, and made up of three or four smaller ones, the whole connected together so as to form an interrupted filament." Surely, with this difference in the fructification, *C. Brodiæi* has no nearer affinity with its present genus than

Phyllophora, with our native species of which it agrees somewhat in texture, colour, and especially in its tendency to proliferous development.

β. simplex. Stipes short, expanding into an oblong, mostly simple or once-forked, rose-coloured frond. *Greville Alg. Brit.* Fucus membranifolius, var. roseus, *Turner Hist. Fuc. tab.* 74. *fig. m.*

Found on the coast of Devonshire. Nemathecia, resembling those of *C. membranifolius*, are frequent upon this plant, but I have never seen it with thecæ.

GENUS DCXLI. PHYLLOPHORA. *Phyllophora.*

GEN. CHAR. *Frond* cartilaginous or membranaceous, of a purple rose-red colour, plane, proliferous from the disc, furnished with a more or less imperfect or obscure midrib. *Fructification*: thecæ, containing a mass of minute, roundish, free sporules; or sori of simple granules in little foliaceous processes.

In two species, *P. nervosus* and *P. rubens*, nemathecia have been observed, but no granules; the latter is the only British species of the genus, to which seven, variously disposed by previous botanists, are referred by its author, Dr. Greville. The name, from *φύλλον, a leaf*, and *φορέω, to bear*, alludes to the proliferous character of the frond.

PHYLLOPHORA RUBENS. *Red Phyllophora.* TAB. **2389.**

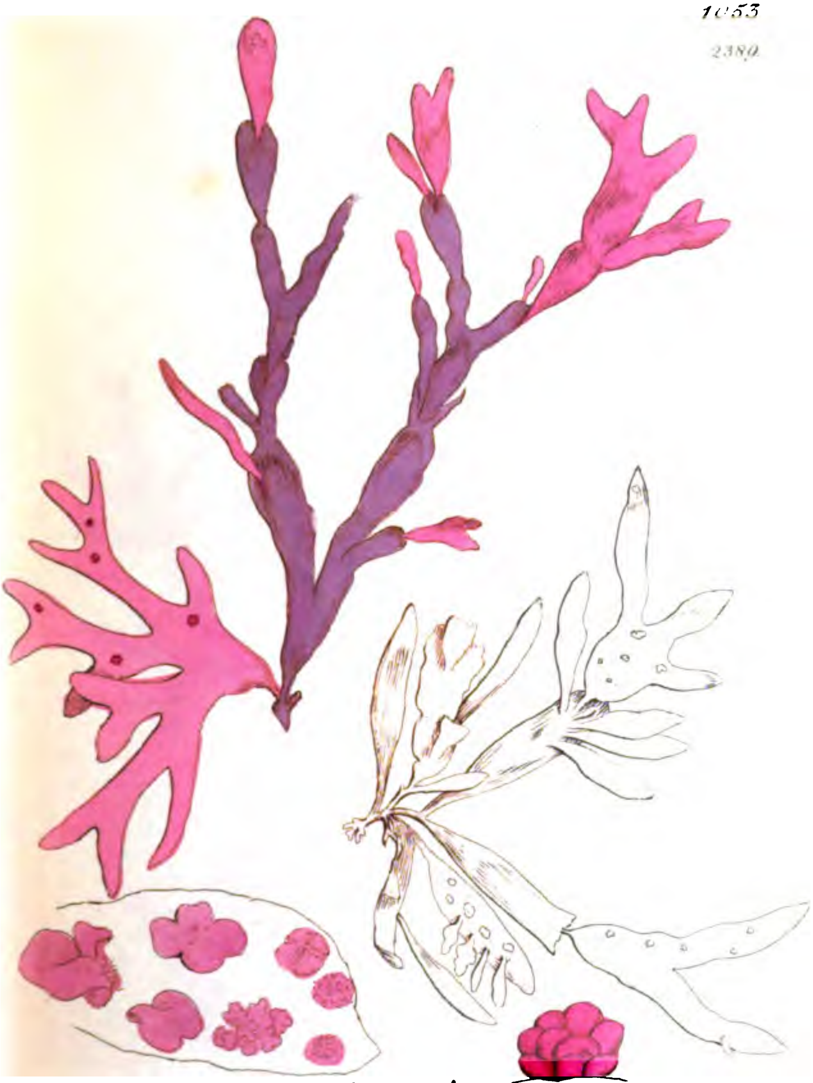
Stipes very short, expanding into a linear-wedge-shaped frond, obscurely ribbed, and repeatedly branched with proliferous shoots resembling the primary frond. Thecæ on the disc of the frond, hemispherical, sessile, very rugose.

Fucus rubens, *Linn. E. B.* 1053. *Turner Hist. Fuc. tab.* 12. Phyllophora rubens, *Greville Alg. Brit.* 135. *tab.* 15. *Hooker Crypt. Part* 1. 303. Sphærococcus rubens, *Agardh Spec. Alg.* 1. 237. *Sprengel.* Chondrus rubens, *Lyngbye.* Delesseria rubens, *Lamouroux.* Fucus prolifer, *Lightfoot.* F. crispus, *Hudson.*

Frequent on the coast of England, growing on rocks and stones, rare in the North, and generally cast ashore among other Algæ. Fronds tufted, attached by a small hard disc, three to six inches long, thin, rigid, red or pink, branched from the base; branches repeatedly proliferous at the extremity, the frondlets springing from the surface, not from the edge or point, of the preceding ones: frondlets rather elliptical than linear, entire at the margin, the ultimate ones forked or palmate, more or less acute. Thecæ hemispherical, much-wrinkled, thick, sessile. Nemathecia dark red, on the under surface of minute, subpeltate, roundish or ovato-lanceolate frondlets, scattered over the disc of the primary ones, always on different plants from those which

1053

2380.



Phyllophora rubens.

Aug.t 1 1802 Publiſhed by Ja.s Sowerby, London.

1478

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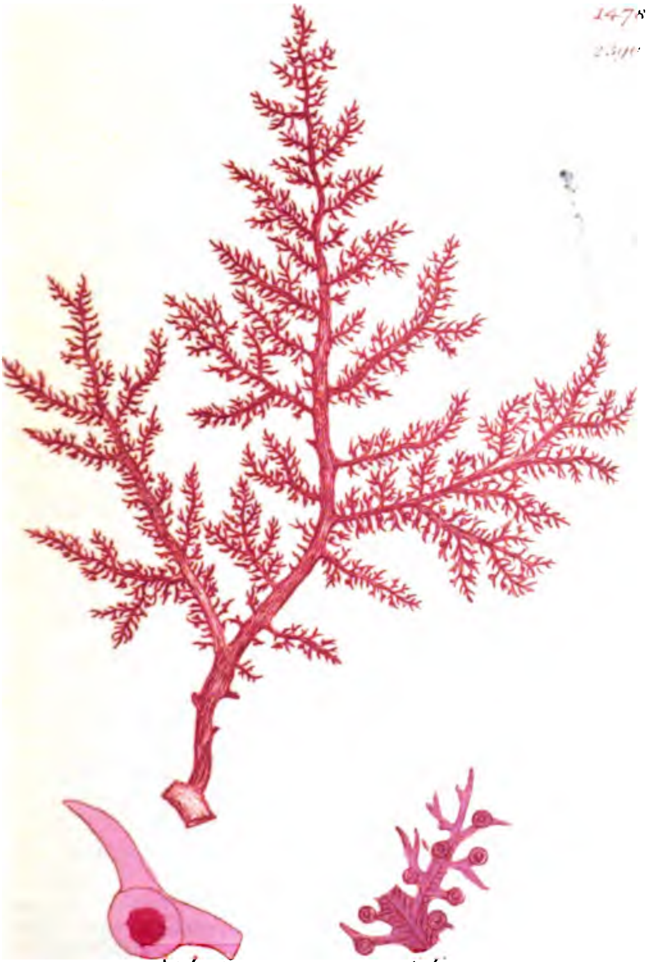


Sphaerococcus coronopifolius

Feb. 1. 1805. Published by J. Sowerby, London

bear thecæ. Fructification in the winter. It does not adhere to paper in drying.

The traces of midrib are generally very slight, and seldom extend more than half an inch from the stipes, at least not in the specimens which have fallen under my notice.

Genus DCXLII. SPHÆROCOCCUS. *Sphærococcus.*

Gen. Char. *Frond* cartilaginous, compressed, two-edged, linear, distichously branched. *Fructification*: mucronate thecæ, containing a mass of ovate, shortly pedicellate, red sporules.

This genus, proposed by Stackhouse, was, as adopted by Agardh, one of considerable extent, including almost all the species of *Rhodomenia*, *Gigartina*, *Chondrus*, *Phyllophora* and *Gelidium*, an assemblage too heterogeneous to remain unaltered. Dr. Greville limits it in his 'Algæ Britannicæ' to two known species, *Fucus coronopifolius* of Goodenough and Woodward, and *F. crinitus* of Gmelin, of course under a modified generic character.

The name, from σφαῖρα, *a globe*, and κόκκος, *fruit*, is expressive of the form of the thecæ.

The distinct thecæ and pedicellate sporules distinguish it from *Gelidium*.

SPHÆROCOCCUS coronopifolius. *Buck's-horn Sphærococcus.* Tab. 2390.

Frond cartilaginous, much-branched in a distichous and alternate manner, compressed and two-edged below, nearly flat upwards; the branches acute at the apex. Thecæ spherical, mucronate, on little stalks fringing the smaller branches.

Fucus coronopifolius, *Goodenough and Woodward in Linn. Trans. E. B.* 1478. *Turner Hist. Fuc. tab.* 122. Sphærococcus coronopifolius, *Agardh Spec. Alg.* 1. 291. *Sprengel. Greville Alg. Brit.* 138. *tab.* 15. *Hooker Crypt. Part* 1. 304. Gelidium coronopifolium, *Lamouroux.* Desmia Hornemanni, *Lyngbye Hydroph. Dan.* 35. *tab.* 7.

Frequent on the southern shores of England and on various parts of the Irish coast; found by Dr. Greville in the Isle of Bute, the only Scottish habitat on record. Frond with a hard, roundish, somewhat discoid base, from a few inches to a foot or more in length, very much branched, cartilaginous, various shades of red, scarlet or pink, compressed, thicker in the middle, so as to appear two-edged, with an obscure midrib and parallel lateral veins, only distinguishable under a magnifier, and chiefly in the younger branches. Thecæ subspherical, not truly either stalked or mucronate, but fixed on one side of the small, ultimate branches, generally about the middle; when fertile these latter are setaceous, but when barren dilated or compressed like the other parts of the frond. Perennial. Fructification in the autumn and winter.

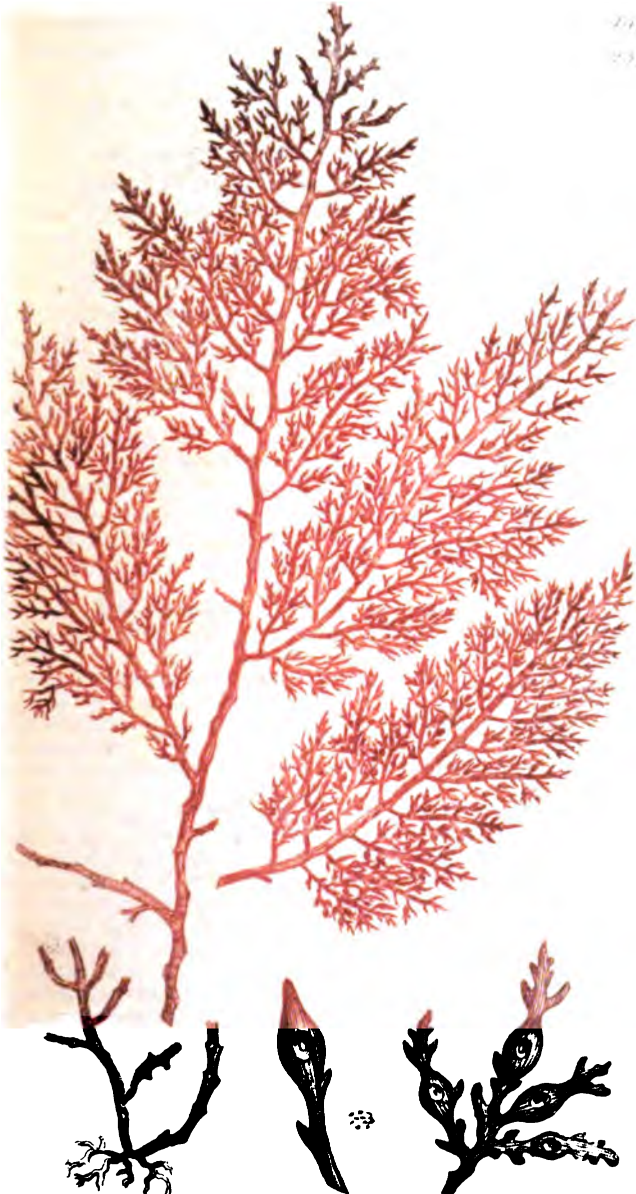
A very beautiful species, scarcely changing colour in drying, almost too horny to adhere to paper. Probably of tropical origin, being a native of the West Indian seas, which may account for its not being met with on our eastern and northern shores.

GENUS DCXLIII. GELIDIUM. *Gelidium.*

GEN. CHAR. *Frond* between cartilaginous and horny, compressed, linear, more or less regularly pinnated. *Fructification* of two kinds: thecæ imbedded in the substance of the ramuli, containing a mass of minute, roundish sporules; or ternate or otherwise compound granules, contained in the ramuli, on distinct individuals.

Fourteen or fifteen species, constituting a very natural and highly beautiful series of marine plants, are comprised under the above character. They are of various shades of red, often very brilliant, and the same specimen occasionally presents several tints, from a deep purplish-crimson to a bright scarlet, pink and yellowish-white, the effect probably of different degrees of exposure to air and light. Only two of the species have been met with on our shores, one a native, the other a rare visitant from warmer climates, to which the genus is almost exclusively confined: those of which I have seen perfect specimens have creeping fibrous bases, and the lower branches sometimes manifest a tendency to fix by the development of small scuta where they touch the rock; they are therefore perennial. By boiling in water nearly the whole substance of the frond is converted into a kind of jelly; hence the generic name bestowed by Lamouroux, from the Latin *gelu*, frost, *gelidus*, frozen, whence our *gelatine*.

Several of the species are employed as food in India and other tropical maritime countries of the East; and it has been long supposed that one of them yields the swallow of the Indian Archipelago, *Hirundo esculenta*, material for the construction of its edible nests, so highly valued by the epicures of China as to be sold there, it is said, in seasons of scarcity, for nearly their weight in gold. From examination however of specimens of these nests in my possession, it appears that *Gigartina lichenoides* forms their chief, if not their entire substance; as although the plant has undergone a considerable



Gelidium cartilagineum?

[illegible]

degree of maceration to enable it to adhere together, the thin extremity of the nest presents it in a nearly natural state, and thus affords an opportunity to compare its tissue under the microscope with that of the last-mentioned Alga, which is abundant on all the rocky shores of the Indian Ocean*.

GELIDIUM CARTILAGINEUM. *Cartilaginous Gelidium.* TAB. 2391.

Frond horny, repeatedly pinnatifid, with horizontal, alternate, linear segments. Thecæ elliptical, imbedded in the ultimate ramuli near the extremity.

Fucus cartilagineus, *Linn.* *Turner Hist. Fuc. tab.* 124. *E. B.* 1477. Gelidium cartilagineum, *Greville Alg. Brit.* 140. *Hooker Crypt. Part* 1. 304. G. concatenatum et versicolor, *Lamouroux.* Sphærococcus cartilagineus, *Agardh Spec. Alg.* 1. 286. *Sprengel.*

Sent to Dr. Withering from Fresh-water Bay in the Isle of Wight. At most only an occasional and chance visitant, certainly not vegetating on our shores. Common in the Mediterranean and the adjoining parts of the Atlantic, but the finest specimens are from the Indian Ocean. Frond fixed by a mass of creeping figures, often from one to two feet in length, repeatedly branched, three or four times pinnatifid, with nearly flat, linear, filiform segments, the ultimate ones crowded, very short and obtuse. Thecæ roundish-ovate, causing elliptical swellings near the extremity of the ultimate ramuli in which they are imbedded: granules compound, "surrounded with a pellucid border," occupying the place of thecæ on distinct plants. Perennial.

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* The nests are of the average size and shape of the bowl of a large table-spoon, but much deeper, and seem to be formed by laying the more or less bruised and macerated weed lengthwise and parallel, but converging towards the extremities of an oval or oblong trough: they are of a white or yellowish hue, semitransparent, and of a horny texture, but brittle. The birds generally build in caverns on the sea-shore, attaching the nest to the perpendicular cliffs and precipices either by one of its margins or extremities, according to circumstances; in some of the largest the point of attachment is not larger than the tip of the finger, in others it occupies the whole of one side of the nest. Some other adhesive medium than that which composes the substance of the nest seems to be employed to fix it; but whether this be the case or not, the adhesion is so strong, that in breaking away the fragile fabric a portion of the stone frequently comes away with it. The danger of collecting them is very great, as the adventurers have often to descend several hundred feet over a raging sea by ropes or ladders of bamboo cane, before they can reach the caverns in which the birds build, and afterwards to seek the nests in their otherwise inaccessible cavities, sometimes by torch-light, in situations where a false step, the loosening of a projecting fragment of rock, or some other unforeseen casualty, would hurl them in an instant to destruction. The quantity annually exported, chiefly to China, from Java and the neighbouring islands, averages between 200,000 and 300,000 lbs. weight: the collection takes place twice a year, the best nests being generally those taken at the commencement of each season, previous to their being defiled by the young birds; these sell in Java at about the rate of their weight in silver, a price which is more than doubled at Canton, and enhanced still more before they reach the consumer in the more distant parts of the empire; they are therefore only attainable by the most opulent. They are eaten, stewed like mushrooms, or in the form of a rich soup, and are esteemed highly restorative.

Few marine plants equal this in beauty and diversity of colour. It does not adhere to paper in drying.

GELIDIUM CORNEUM. *Horny Gelidium.* TAB. 2392.

Frond between cartilaginous and corneous, nearly flat, distichously branched; branches pinnate or bipinnate, linear, attenuated; pinnulæ mostly opposite, patent, obtuse, bearing the spherical or elliptical thecæ imbedded in their extremity.

Fucus corneus, *Hudson.* *Turner Hist. Fuc. tab.* 257. *E. B.* 1970. Gelidium corneum, *Lamouroux.* *Greville Alg. Brit.* 141. *tab.* 15. *Hooker Crypt. Part* 1. 305. Sphærococcus corneus, *Agardh Spec. Alg.* 1. 279. *Sprengel.*

Frequent on the rocky parts of the coast of Great Britain and Ireland, especially in pools left by the tide. Fronds two or three inches to a span in length, tufted, fixed by a small discoid base accompanied by a few creeping fibres, of a deep purple, red, pink or tawny yellow colour with a waxy transparency, repeatedly branched; branches very regularly pinnated or pectinated, sometimes simply, often doubly or triply; the lower ones often decumbent, developing scuta and fibres where they touch the rock, whence the tufts are sometimes so dense and entangled that they are with difficulty separated. Perennial. Fructification in the summer and autumn.

Exceedingly variable in size, in the division of the frond, and form of its segments; hence its varieties have often been considered as distinct species, though, passing by almost imperceptible grades into each other, they are with difficulty definable. The following list comprises the most marked deviations from the ordinary form found upon our shores.

β. filicinum. Frond setaceous; pinnæ horizontal, widened, very blunt.—*Turner.* Fucus filicinus, *Hudson.* F. nereidus, *Lightfoot.*

γ. pinnatum. Frond narrow, tripinnate; pinnæ patent, nearly linear, bluntish.—*Turner.* Fucus pinnatus, *Hudson.* F. hypnoides, *Desfontaines.*

δ. uniforme. All the pinnæ patent, attenuated at the base, obtuse at the points and scattered.—*Turner.*

ε. capillaceum. Frond narrow; pinnæ clustered towards its summits, nearly setaceous, somewhat erect.—*Turner.* Fucus capillaceus, *Gmelin Hist. Fuc. tab.* 15. *fig.* 1.

ζ. deforme. Frond twisted, irregularly pinnated; pinnæ divaricated, oblong, very short, undivided.—*Turner.*

η. sesquipedale. Frond long, between compressed and flat, tripinnate; pinnæ attenuated at the base; ramuli linear-oblong, short, obtuse.—*Turner Hist. Fuc. tab.* 257. *fig. f.*

θ. confertum. Frond compressed, repeatedly pinnated; pinnæ and pinnulæ long, very thin, acute, and irregularly divided.—*Turner.*

ι. attenuatum. Frond compressed, in the lower part simply pinnated, in the upper tripinnate; ramuli extremely short, some acute, others obtuse.—*Turner.*

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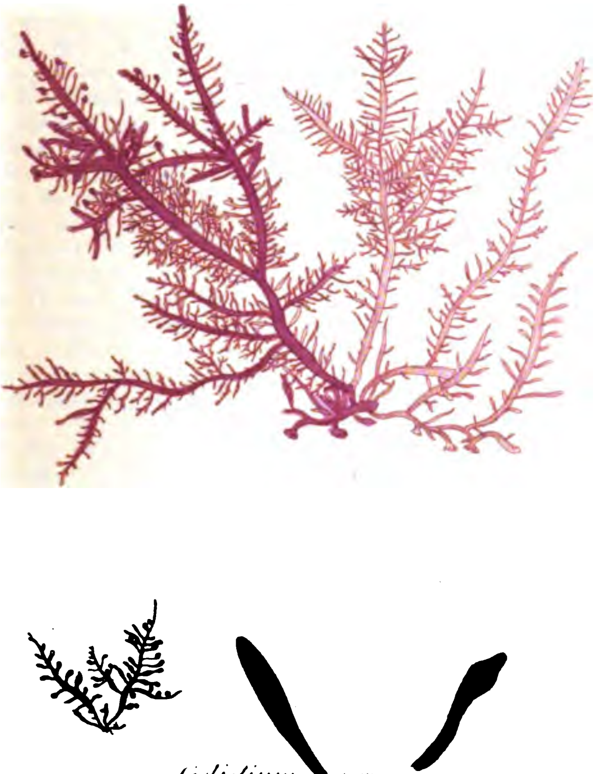

Gelidium corneum ?

June 1. 1809 Publish'd by Jas. Sowerby London.

κ. pulchellum. Frond capillary, compressed, tripinnate; pinnæ between linear and clavate, obtuse.—*Turner Hist. Fuc. tab.* 257.*fig. p.*

λ. claviferum. Frond subcylindrical, capillary, irregularly divided; ultimate pinnulæ obovate, edged with minute scattered teeth.—*Turner Hist. Fuc. tab.* 257.*fig. g.*

μ. abnorme. Frond compressed, irregularly branched, naked in its lower part, towards the middle generally bearing a few simple, scattered pinnæ, and near the apices clusters of short deflexed ramuli.—*Turner Hist. Fuc. tab.* 257.*fig. r.*

ν. latifolium. Frond broad, nearly flat; pinnæ linear-lanceolate, mostly simple, set with numerous short, setaceous pinnulæ.—*Greville Alg. Brit.* 143.

ξ. aculeatum. Frond compressed, very thin, irregularly pinnated; pinnæ divaricated, irregularly divided and set with minute, divaricated, subulate ramuli, crowded towards the summit of the frond.—*Greville Alg. Brit.* 143.

ο. clavatum. Frond capillary, between cartilaginous and membranaceous, decumbent, creeping; ramuli in the form of inversely lanceolate or ovate leaves, much attenuated at their insertion. Sphærococcus corneus, var. clavatus, *Agardh Spec. Alg.* 1. 284. Gelidium clavatum et intricatum, *Lamouroux.* Chondria pusilla, *Hooker Fl. Scot. Grev. Crypt. Fl. tab.* 79. Fucus pusillus, *Stackhouse. Turner Hist. Fuc. tab.* 108. F. cæspitosus, *Stackhouse.*

π. crinale. Frond setaceous, subcylindrical, subdichotomously branched, sometimes trichotomous at the apex and bearing a few elliptical-oblong ramuli attenuated at their insertion.—*Greville Alg. Brit.* 145. Sphærococcus corneus, var. crinalis, *Agardh Spec. Alg.* 1. 285. Fucus crinalis, *Turner Hist. Fuc. tab.* 198.

The greater number of these varieties is met with on the south coast of England.

GENUS DCXLIV. GRATELOUPIA. *Grateloupia.*

GEN. CHAR. *Frond* cartilagineo-membranaceous, plane, somewhat pinnated with branchlets, or fringed with foliaceous processes. *Fructification*: minute aggregated tubercles, furnished with a pore, and containing a mass of free, elliptical or roundish sporules.

The genus, a very small one, including three, or at most four known species, was established by Agardh, and named by him in compliment to Dr. Grateloup, a French algologist. The chief character of distinction between it and the rest of the *Florideæ* is the peculiar fructification, which, though at first sight it appears to resemble that of some *Fucoideæ*, in situation and in the terminal pore approaches nearer to that of the *Gastrocarpeæ*. The species seem to belong naturally to warm climates; *G. filicina* is a native of the Mediterranean, and only very sparingly found on the extreme southern coast of England, and *G. hystrix* and *G. ornata* belong to the South Atlantic and Indian Oceans.

GRATELOUPIA FILICINA. *Fern-like Grateloupia.* TAB. 2393.

Frond linear, attenuated, simple or divided, irregularly pinnated with ramuli attenuated at each extremity.

Grateloupia filicina, *Agardh Spec. Alg.* 1. 224. *Sprengel. Greville Alg. Brit.* 151. *tab.* 16. *Hooker Crypt. Part* 1. 306. *Hooker in E. B. Supp.* 2780. Delesseria filicina, *Lamouroux.* Fucus filicinus, *Wulfen. Turner Hist. Fuc. tab.* 150.

Discovered by Miss Cutler "among other submarine productions, and on rocks, at Sidmouth and Ilfracombe, producing fructification in the autumn." Perennial. Fronds two to six inches high, tufted, fixed by a small scutate base, deep purplish-red, irregularly pinnate or bipinnate; pinnæ nearly horizontal, various in length and in disposition, crowded or remote, opposite or alternate, sometimes secund. Fructification, minute, clustered tubercles, imbedded in the substance of the pinnæ or pinnulæ, opening by a pore, and containing minute elliptical sporules.

" Dr. Greville remarks, that the plate given by Mr. Turner of this species will be of little assistance to the British botanist in determining our native plant: but we have had occasion to observe, in the 'British Flora,' that it well agrees with numerous specimens which we possess from the Mediterranean, and which we believe to be identical with the original plant of Wulfen. So that it is a question with us whether the plant of our shores ought not to be considered distinct from the foreign specimens, which are of an olive-green colour when dry, are copiously once or twice pinnated, and of a very lubricous texture, so as to adhere firmly to paper."—*Hooker.*

The olive-green hue, here ascribed to the foreign specimens, is not universal, and is sometimes seen in those of British growth.

GENUS DCXLV. CHÆTOSPORA. *Chætospora.*

GEN. CHAR. *Frond* subgelatinous, filiform, branched, rose-coloured; ultimate ramuli setaceous, swelling into lanceolate receptacles, composed of naked, branched filaments, radiating from an axis, in the centre of which is situated the obscure fructification.

The single, curious species of which this genus is at present composed is one of very doubtful position, some considering it as akin to *Mesogloia*, in the suborder *Gloiocladeæ*, while Agardh places it among the *Confervoideæ*; with the former, however, the structural affinity only extends to the supposed

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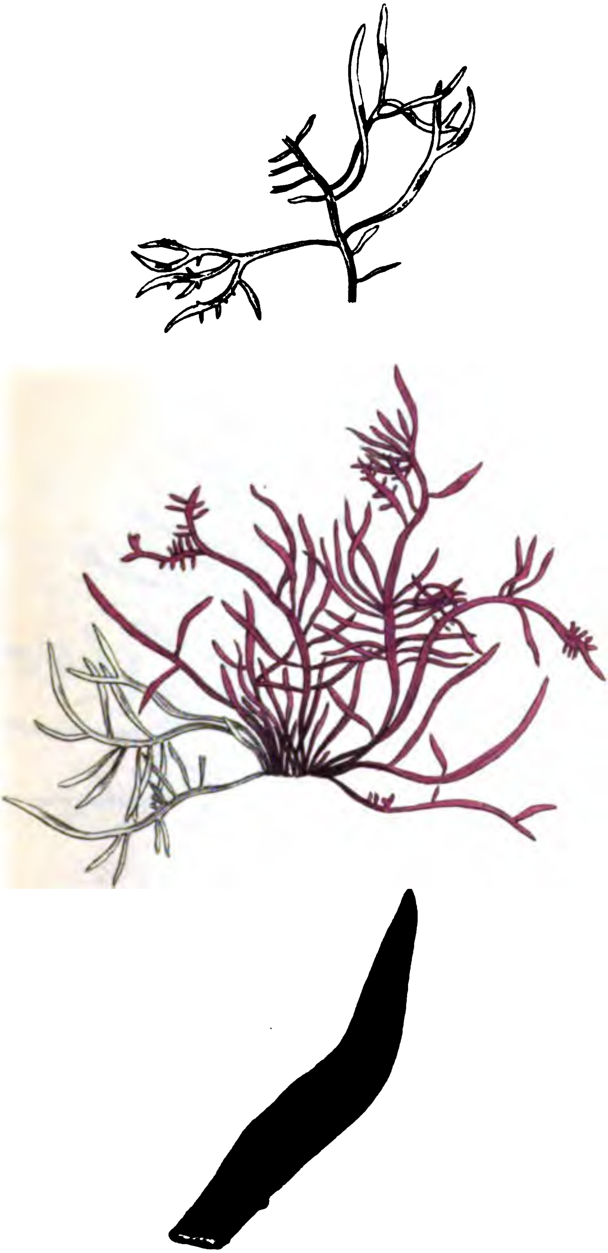
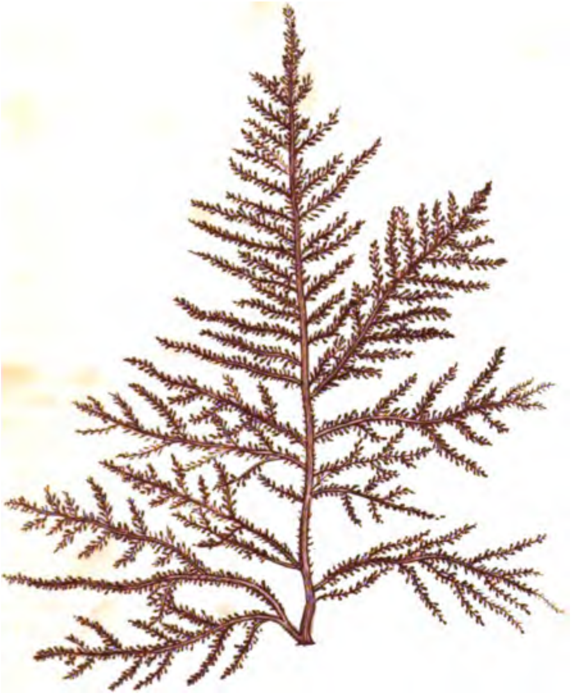


Grateloupia filicina?

October 1st 1833.

1165

2394



Chætospora Wigghii?

May 1 1803 Published by Jas Sowerby, London.

fructiferous ramuli, the rest of the plant being cellular, the cellules, according to Dr. Greville, large in the centre and gradually smaller towards the circumference,—a structure of course equally at variance with that of the latter series. The fructification is exceedingly obscure: Mr. Turner describes it as consisting of "extremely minute, oblong, dark-red, sessile seeds;" Dr. Greville doubts whether the axis of the ramuli contains sporules or thecæ. The plant is of rare occurrence, and few botanists seem to have had an opportunity of examining it in a recent state: in drying it shrinks so much that it is scarcely possible to arrive at any very satisfactory microscopical analysis.

Named from the Greek *χαίτη, a bristle*, and *σπορὰ, a seed*, alluding to the structure of the ramuli.

CHÆTOSPORA Wigghii. *Mr. Wigg's Chætospora.* Tab. **2394.**

Fucus Wigghii, *Turner Hist. Fuc. tab.* 102. *E. B.* 1165. Chætospora Wigghii, *Agardh Spec. Alg.* 1. 146. *Greville Alg. Brit.* 153. *Hooker Crypt. Part* 1. 306. Cladostephus Wigghii, *Sprengel.*

First found at Yarmouth by Mr. Wigg, and occasionally met with on the southern coast of England and Ireland, but never attached to the rocks, and apparently only a casual visitant, as it is likewise on the coast of France, its natural habitat being yet unknown. An exceedingly beautiful and delicate species, of a light transparent rose-colour, sometimes changing to green, especially in drying, during which process it adheres firmly to paper. Frond from two or three inches to a span in length, very slender, thread-like, branched throughout irregularly both as to length and disposition; branches simple, or more frequently once or twice divided; all of them, and occasionally the stem likewise, more or less thickly beset with minute setaceous processes, many of which are enlarged towards the extremity into a spindle shape, and are regarded as fructification; the axis of these is a dark line of obscure granular or cellular structure, swollen in the thickest part into an opake elliptical mass, from which radiate in all directions, numerous, branched, articulated filaments, so crowded as to form a compact spongy covering over the whole process: the disposition of these filaments is shown in the magnified section. Supposed annual, being only thrown ashore during the summer.

Perhaps more frequent than generally considered, but being of a very delicate texture it is rarely found entire, and, as observed by Dr. Greville, when deprived of its ramuli and battered by the waves, it is very liable to be mistaken for *Ceramium rubrum.*

Genus DCXLVI. PTILOTA. *Ptilota.*

Gen. Char. *Frond* compressed or flat, pectinato-pinnate, of a red colour, between membranaceous and cartilaginous.

Fructification minute, aggregated: thecæ surrounded by an involucrum.

A small genus, established by Agardh, consisting of only four known species, distinctly and beautifully defined by the feathered form of the frond, and the remarkable involucrum-like processes by which the thecæ are invested.

The name, from the Greek πτιλωτὸς, *winged* or *feathered*, is characteristic of the delicately pinnated structure of the frond.

PTILOTA PLUMOSA. *Feathered Ptilota.* TAB. 2895.

Frond cartilaginous, compressed, much and irregularly branched; the branches repeatedly pectinato-pinnated; ultimate segments opposite, bearing the fructification at their apices.

Fucus plumosus, *Linn.* *E. B.* 1308. *Turner Hist. Fuc, tab.* 60. Ptilota plumosa, *Agarah Spec. Alg.* 1. 385. *Sprengel.* *Greville Alg. Brit.* 155. *tab.* 16. *Hooker Crypt. Part* 1. 307. Plocamium plumosum, *Lamouroux.*

Frequent on our rocky sea-shores throughout the kingdom. Fronds tufted, three inches to a span in length, attached by a small, convex, callous disc: stem slender, linear, compressed, irregularly branched, and subdivided; the branches all finely pectinated with compound, pectinated branchlets or ramuli: the minute, ultimate subdivisions are setaceous, compressed, opposite, and here and there tipped with the fructification. Involucrum formed of five or six linear, incurved segments, containing generally two or three spherical thecæ: besides terminating the ultimate ramuli the involucra are occasionally met with, arranged alternately on short footstalks opposite to the main subdivisions of the branches. Sporules roundish-ovate, seldom more than three or four in each theca. Perennial. Fructification in the summer and autumn. Colour in the younger branches pale crimson or pink, in the older deep purplish-red passing into brown. A slight appearance of articulation is sometimes visible in the ultimate ramifications, but is especially characteristic of the following variety.

β. capillaris. **Frond flaccid, very narrow, the pinnæ jointed, nearly cylindrical.** Ptilota plumosa, var. tenuissima, *Agardh Spec. Alg.* 1. 386. Fucus plumosus, var. capillaris, *Turner Hist. Fuc. tab.* 60. *fig. g—k.*

A form of the species not unfrequent on the perpendicular faces of rocks, scarcely recognizable as belonging to it but by the peculiar mode of branching and the comparison of intermediate specimens, having much of the general aspect of a *Confervoid* plant, and never producing the involucrated thecæ so strikingly characteristic of the plant in its normal state. Minute roundish granules, investe by a pellucid limbus, occur either solitary or in clusters on various parts of the ultimate pinnulæ, but never accompanied by an involucrum; Dr. Greville observes that he has found similar ones on the broadest forms of variety *α*, but they are not common.

1308.

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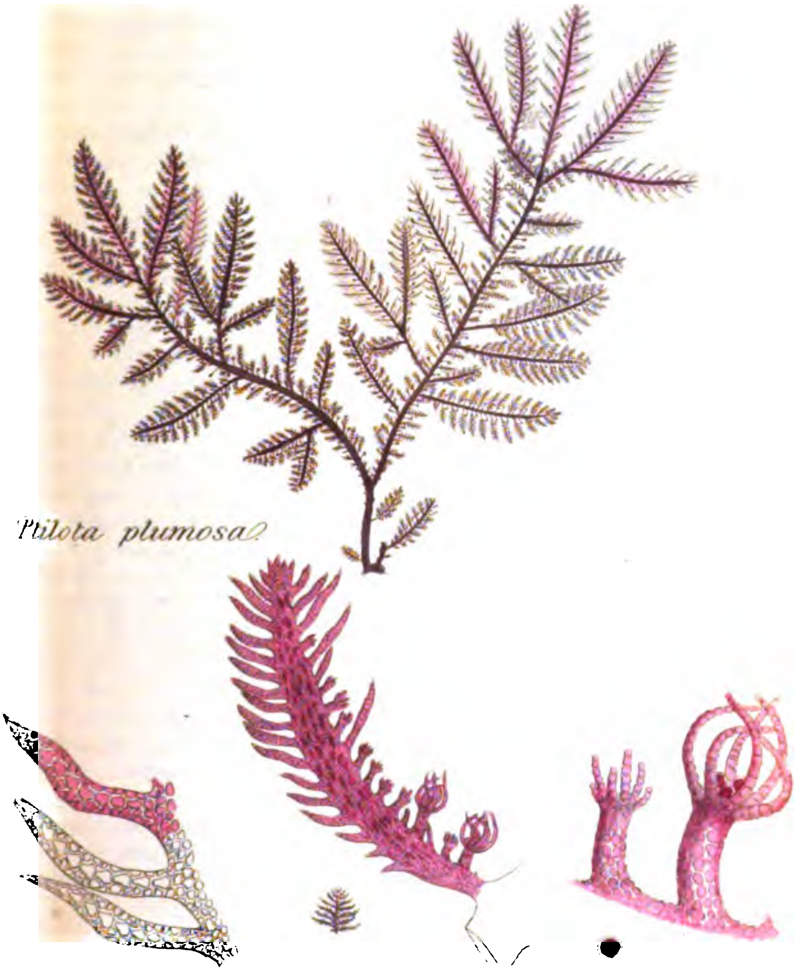


Ptilota plumosa

Nov 1 1804. Publish'd by Jas Sowerby London

Fructification minute, aggregated: thecæ surrounded by an involucrum.

A small genus, established by Agardh, consisting of only four known species, distinctly and beautifully defined by the feathered form of the frond, and the remarkable involucrum-like processes by which the thecæ are invested.

The name, from the Greek πτιλωτὸς, *winged* or *feathered*, is characteristic of the delicately pinnated structure of the frond.

PTILOTA plumosa. *Feathered Ptilota.* Tab. 2895.

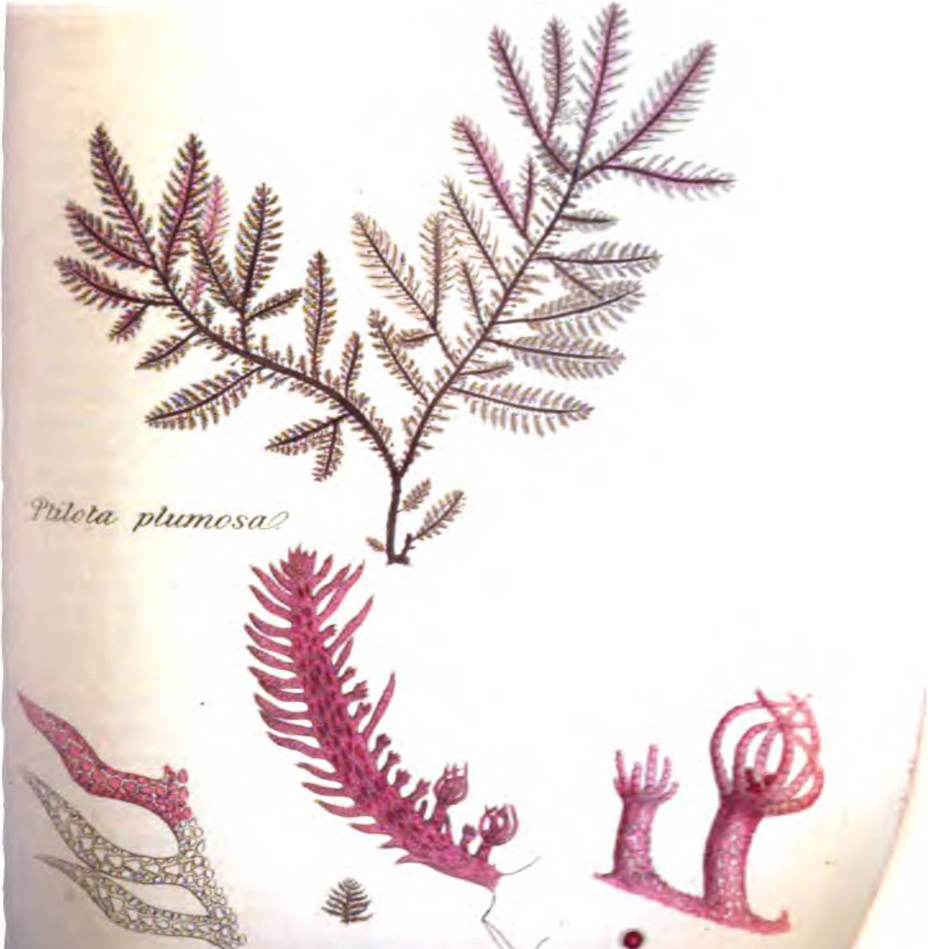
Frond cartilaginous, compressed, much and irregularly branched; the branches repeatedly pectinato-pinnated; ultimate segments opposite, bearing the fructification at their apices.

Fucus plumosus, *Linn.* *E. B.* 1308. *Turner Hist. Fuc. tab.* 60. Ptilota plumosa, *Agardh Spec. Alg.* 1. 385. *Sprengel.* *Greville Alg. Brit.* 155. *tab.* 16. *Hooker Crypt. Part* 1. 307. Plocamium plumosum, *Lamouroux.*

Frequent on our rocky sea-shores throughout the kingdom. Fronds tufted, three inches to a span in length, attached by a small, convex, callous disc: stem slender, linear, compressed, irregularly branched, and subdivided; the branches all finely pectinated with compound, pectinated branchlets or ramuli: the minute, ultimate subdivisions are setaceous, compressed, opposite, and here and there tipped with the fructification. Involucrum formed of five or six linear, incurved segments, containing generally two or three spherical thecæ: besides terminating the ultimate ramuli the involucra are occasionally met with, arranged alternately on short footstalks opposite to the main subdivisions of the branches. Sporules roundish-ovate, seldom more than three or four in each theca. Perennial. Fructification in the summer and autumn. Colour in the younger branches pale crimson or pink, in the older deep purplish-red passing into brown. A slight appearance of articulation is sometimes visible in the ultimate ramifications, but is especially characteristic of the following variety.

β. capillaris. Frond flaccid, very narrow, the pinnæ jointed, nearly cylindrical. Ptilota plumosa, var. tenuissima, *Agardh Spec. Alg.* 1. 386. Fucus plumosus, var. capillaris, *Turner Hist. Fuc. tab.* 60. *fig. g—k.*

A form of the species not unfrequent on the perpendicular faces of rocks, scarcely recognizable as belonging to it but by the peculiar mode of branching and the comparison of intermediate specimens, having much of the general aspect of a *Confervoid* plant, and never producing the involucrated thecæ so strikingly characteristic of the plant in its normal state. Minute roundish granules, invested by a pellucid limbus, occur either solitary or in clusters on various parts of the ultimate pinnulæ, but never accompanied by an involucrum. Dr. Greville observes that he has found similar ones on the broadest forms of variety *α*, but they are not common.



Ptilota plumosa

May 1. 1844. Published by Jas. Sowerby London.

TRIBE X. GASTROCARPEÆ.

Marine plants, with a scutate base, of a pink, red, or purplish-red colour, most of them not changing much on exposure to the atmosphere, of a carnose, gelatinoso-cartilaginous or gelatinoso-membranaceous substance: the structure, consisting of a cellular external coat or membrane, and a pellucid, gelatinous internal mass, mostly traversed by colourless, jointed, simple filaments arising from the outer membrane. Frond cylindrical, compressed, or flat, continuous, destitute of midrib or veins. Fructification; roundish clusters or globules of red sporules, imbedded in the internal gelatinous substance of the frond, and generally (if not always) unaccompanied by an external pore.

An examination of the plants of this tribe displays a grade in structure far below that occupied by the *Florideæ*, evinced both in the texture of the frond and in the development of the reproductive germs. The beautiful, often highly regular, and distinctly cellular substance composing the interior in the latter series is no longer seen; an external membrane, the tissue of which is sometimes scarcely determinable by the microscope, invests a mass of gelatinous pulp, in most instances traversed by articulated or moniliform filaments attached to, but not continuous with, the inner surface of the membrane, appearing, in some cases at least, rather to be the result of a tendency to incipient organization in the pulp itself, than a necessary adjunct to the more solid part of the frond. The sporules are not contained in thecæ, but, aggregated mostly in spherical clusters, lie loose in the internal pulp; hence the name given to the tribe by Dr. Greville, from γαστὴρ, the *inside*, and καρπὸς, *fruit*: I am not aware of a single instance among the normal species of the tribe in which any opening or pore exists for their dispersion, the plants, or unquestionably their fronds, are either annual or biennial, and the processes of dissemination and decay are probably simultaneous.

GENUS DCXLVII. IRIDÆA. *Iridæa.*

GEN. CHAR. *Frond* flat, expanded, carnose or gelatinoso-cartilaginous, more or less of a purplish-red colour. *Fructification*; globules of roundish sporules, imbedded between the two coats of the frond.

The exterior of the frond is a thickish membrane, a section of which under the microscope shows it to be composed of short articulated filaments, arranged vertically: the interior is very thickly intersected by very slender fibres formed of elongated vesicles, and the interstices filled with a viscid or semigelatinous fluid. The globules of sporules are invested by a coat of mucus, not sufficiently consolidated to be termed a theca, though probably to be regarded as a prefiguration of that organ.

The name alludes to the iridescent hues of the growing frond in some of the species, the number of which known is not more than eight or nine.

IRIDÆA EDULIS. *Esculent Iridæa.* TAB. **2396.**

Frond subcartilaginous, cuneiform, rounded at the apex, attenuated below into a short stipes.

Fucus edulis, *Stackhouse. Turner Hist. Fuc. tab.* 114. *E. B.* 1307. Iridæa edulis, *Bory de St. Vincent. Greville Alg. Brit.* 158. *tab.* 17. *Hooker Crypt. Part* I. 308. Halymenia edulis, *Agardh Spec. Alg.* I. 202. *Sprengel.* Delesseria edulis, *Lamouroux.* Ulva edulis, *De Candolle. Grev. Fl. Edin.*

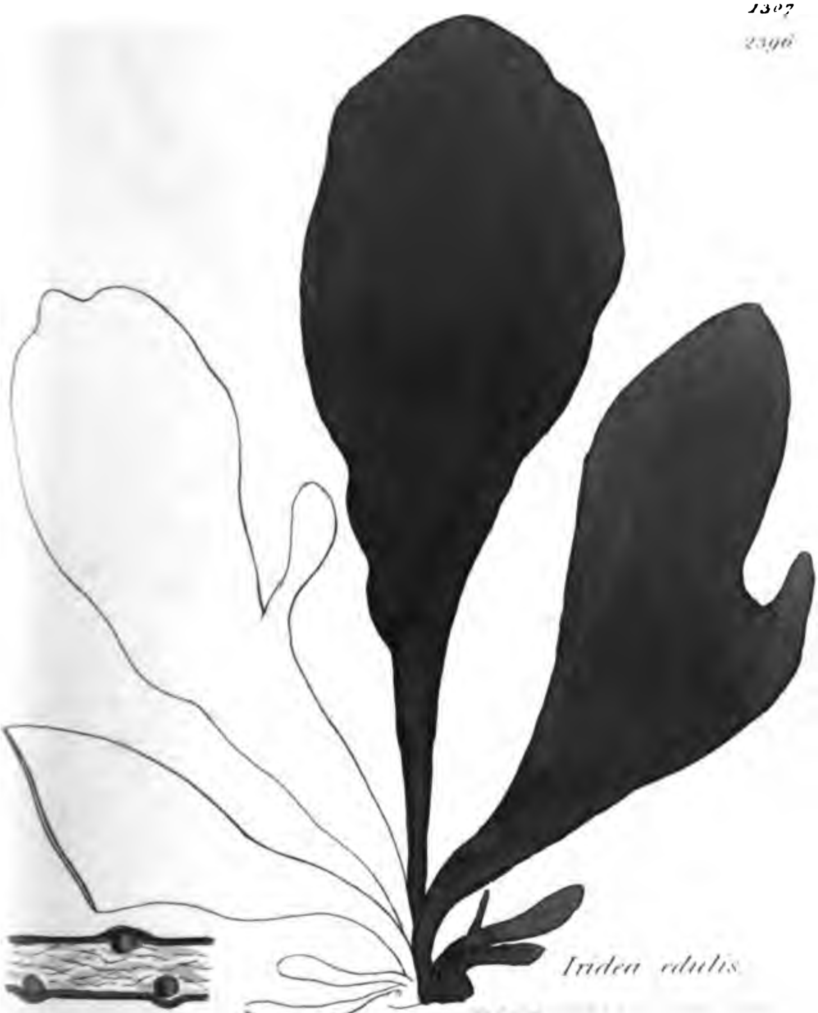
Found on most parts of our coast, but being an inhabitant of deep water, seldom very plentifully, unless sought for beneath low-water mark. Fronds tufted, springing from a hard scutate base, four inches to a span or more in length, deep blood-red or purple, changing to greenish or yellowish-white by exposure, smooth, obovate or wedge-shaped with a rounded apex, and tapering below into a short stem about the thickness of a crow-quill. Fructification confined to the upper part of the frond, which often appears granulated from being sprinkled with minute protuberances, caused by the globular clusters of sporules beneath the outer coat. Base perennial; fronds annual, or perhaps biennial. Fructification in the autumn.

Very seldom met with entire, the thick fleshy frond being easily broken by the action of the waves, which occasions it often to appear somewhat lobed, though naturally not so. Luxuriant specimens are occasionally as much as eighteen inches in length and eight or ten in width at the broadest part: such are generally perforated and eroded in various ways, the plant being a favourite food of crabs, lobsters and other marine animals.

It is sometimes eaten by fishermen and other people on the coast, after being fried or roasted, when it is said to taste like roasted oysters; it is however less frequently used than *Rhodomenia palmata*, an alga with which it was often confounded by the early botanists, although very dissimilar to it in texture, form and fructification.

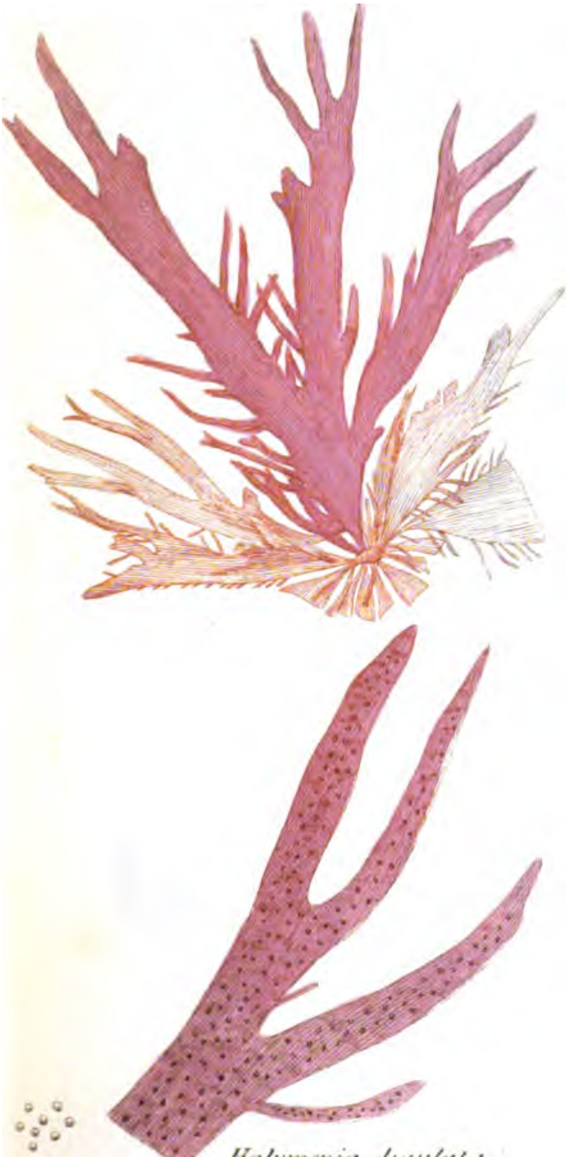
GENUS DCXLVIII. HALYMENIA. *Halymenia.*

GEN. CHAR. *Frond* nearly flat or cylindrical, gelatinoso-



Iridea edulis.

410.
2307



Halymenia ligulata.

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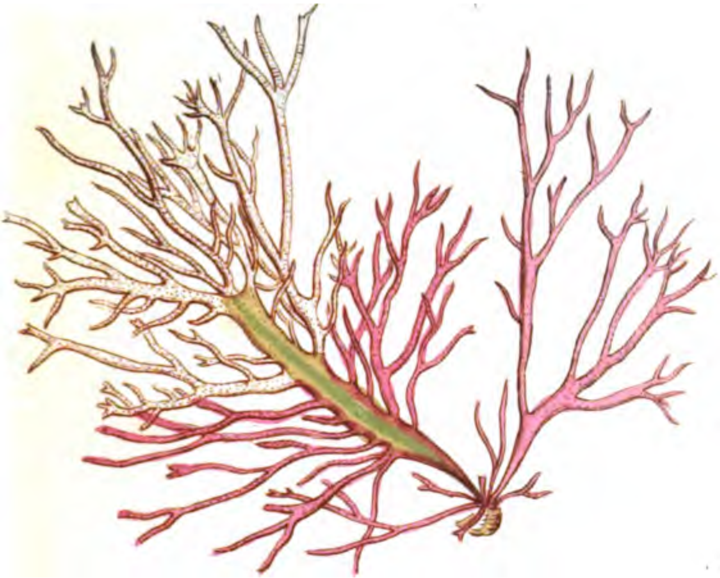
1627

2398.



Halymenia ligulata β.

Aug. 1. 1806. Publish'd by Jas. Sowerby London.

membranaceous, of a pinky-red colour, more or less dichotomous, the segments often laciniated. *Fructification*; punctiform globules of sporules, imbedded in the central substance of the frond.

Though but obscurely defined, as contrasted with the preceding genus, by the above generic characters, the species of the two can scarcely be confounded, the texture and general aspect being altogether different.

The name *Halymenia*, from ἅλς, *the sea*, and ὑμὴν, *a membrane*, literally Sea-membrane, is indicative of the comparative thinness of the outer coat of the frond, added to which its structure is more simple, as well as that of the interior, which is more gelatinous and less intersected by fibro-cellular tissue than that of *Iridæa*.

The genus, established by Agardh, contains nine or ten species.

HALYMENIA LIGULATA. *Strap-shaped Halymenia.* TAB. **2397** and **2398**.

Frond between compressed and plane, irregularly dichotomous, the axils rounded; segments ligulate, attenuated towards the apex, often proliferous on the margin.

Ulva ligulata, *Woodward in Linn. Trans. E. B.* 420. U. rubra, *Hudson. E. B.* 1627. Halymenia ligulata, *Agardh Spec. Alg.* 1. 210. *Sprengel. Greville Alg. Brit.* 162. *tab.* 17. *Hooker Crypt. Part* 1. 308. H. elongata, *Agardh Spec. Alg.* 1. 209.

Chiefly met with on the southern and eastern coasts of England. Fronds tufted, fixed to the rocks by a small scutate base, two or three inches to a foot in length, tapering below into a very short, slender stem, dilating upwards, and becoming more or less wedge-shaped in its general outline, but deeply divided into several, sometimes numerous, unequal segments, variously subdivided, the axils all obtuse or rounded; the ultimate segments are linear, terminating somewhat acutely; the margins are either entire or fringed with linear processes, attenuated at the base, from half an inch to two inches in length, simple or forked. Fructification, minute globular masses of sporules scattered through the whole of the gelatinous substance of the frond, and giving a speckled appearance to the exterior under a magnifier.

The general aspect of the plant is exceedingly variable, chiefly in consequence of the more or less proliferous character of the frond and the breadth of its segments, examples of which are represented in our two figures, originally published as distinct species. The substance is membranaceous, somewhat gelatinous and semipellucid; it is of various degrees of thickness in different specimens, and is generally either flat or compressed, but sometimes the segments are nearly cylindrical or only partially flattened. Colour pinky-red or tawny, the clusters of sporules dark-red. Annual. Fructification in the summer. It adheres firmly to paper in drying.

HALYMENIA FURCELLATA. *Forked Halymenia.* TAB. 2399.

Frond subcylindrical, repeatedly and uniformly dichotomous; the ultimate segments flattened, sublanceolate, obtuse.

Ulva furcellata, *Turner in Schrad. Journ. E. B.* 1881. Halymenia furcellata, *Agardh Spec. Alg.* 1. 212. *Greville Alg. Brit.* 163. *Hooker Crypt. Part* 1. 308. Dumontia triquetra, *Lamouroux.*

Found on rocks and stones, on several parts of the southern and eastern shores of England and the south of Ireland. Fronds several from the same disc, two to four inches high, tender, subgelatinous, repeatedly divided from the very base in a dichotomous or forked manner; segments nearly cylindrical and of equal thickness throughout, except that the ultimate ones are more or less angular or flattened, and sometimes dilated so as to become elliptico-lanceolate. Colour pale brownish-pink or greenish. Clusters of sporules dark brownish-red, globular, larger than in *H. ligulata*, sparingly scattered throughout the interior fibro-gelatinous mass. Supposed annual. Fructification in the summer. It adheres to paper in drying.

GENUS DCXLIX. DUMONTIA. *Dumontia.*

GEN. CHAR. *Frond* cylindrical, simple or branched, membranaceous, tubular, gelatinous within, of a red or purplish-red colour. *Fructification*; globules of sporules attached to the inner surface of the membrane of the frond.

Of five or six species referable to this genus, only one is a native of our seas. By Agardh they were referred to *Halymenia*, but the structure of the typical species, *D. filiformis*, is very different; the interior is wholly gelatinous without any appearance of filaments, and the sporules, aggregated in roundish clusters, are not free, but attached by one extremity to the inner surface of the coat of the frond. Named by Lamouroux in honour of M. Dumont, one of the contributors to the 'Dictionnaire d'Histoire Naturelle.'

DUMONTIA FILIFORMIS. *Filiform Dumontia.* TAB. 2400.

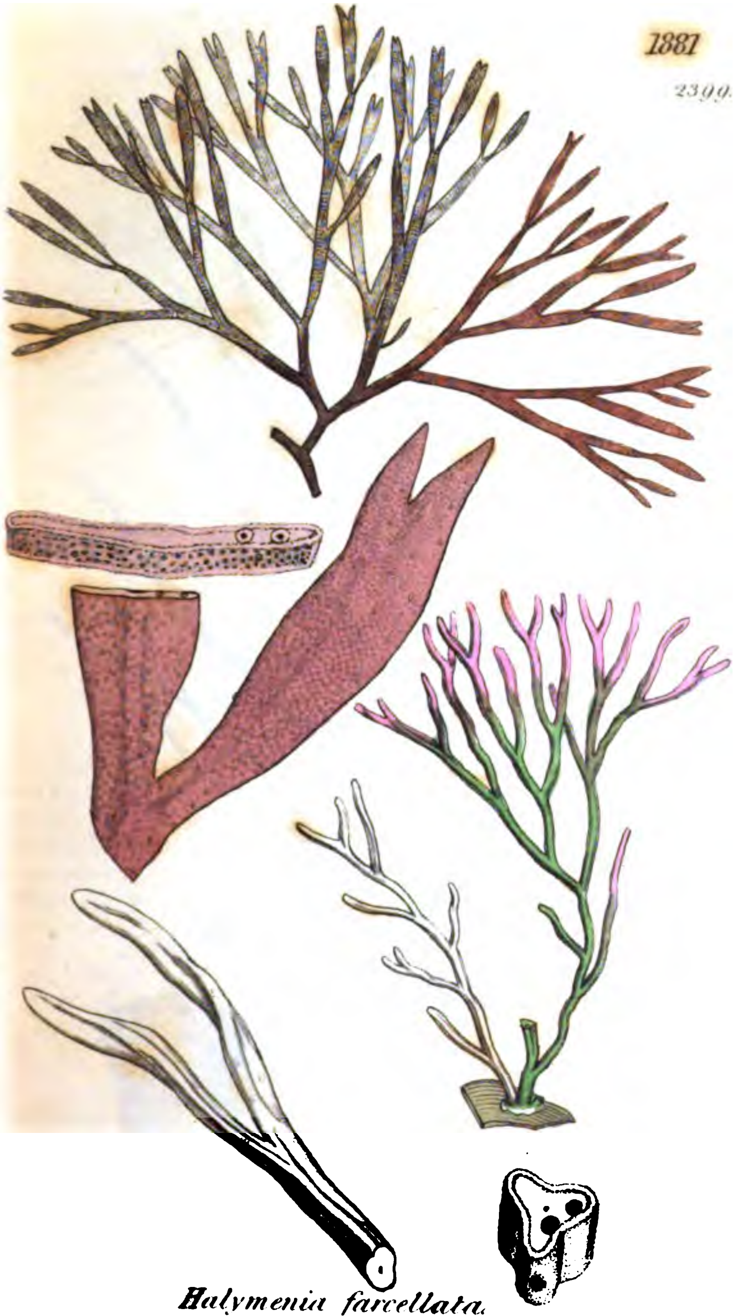
Frond filiform, attenuated at each extremity, pinnately and subfastigiately branched; branches simple, elongated, attenuated at the base and apex, rarely forked.

Ulva purpurascens, *E. B.* 641, *not of Hudson.* Dumontia filiformis, *Greville Alg. Brit.* 165. *tab.* 17. *Hooker Crypt. Part* 1. 308. D. incrassata, *Lamouroux.* Halymenia filiformis, *Agardh Spec. Alg.* 1. 214. Gastridium filiforme, *Lyngbye Hydroph. Dan. tab.* 17. Chondria purpurascens, *Grev. Fl. Edin.* Solenia filiformis, *Sprengel.* Ulva incrassata, spongiformis et filiformis, *Fl. Dan.*

Common on all our shores, growing on rocks, stones, shells and other marine substances, sometimes epiphytic on *Fuci* and *Laminariæ*.

1881

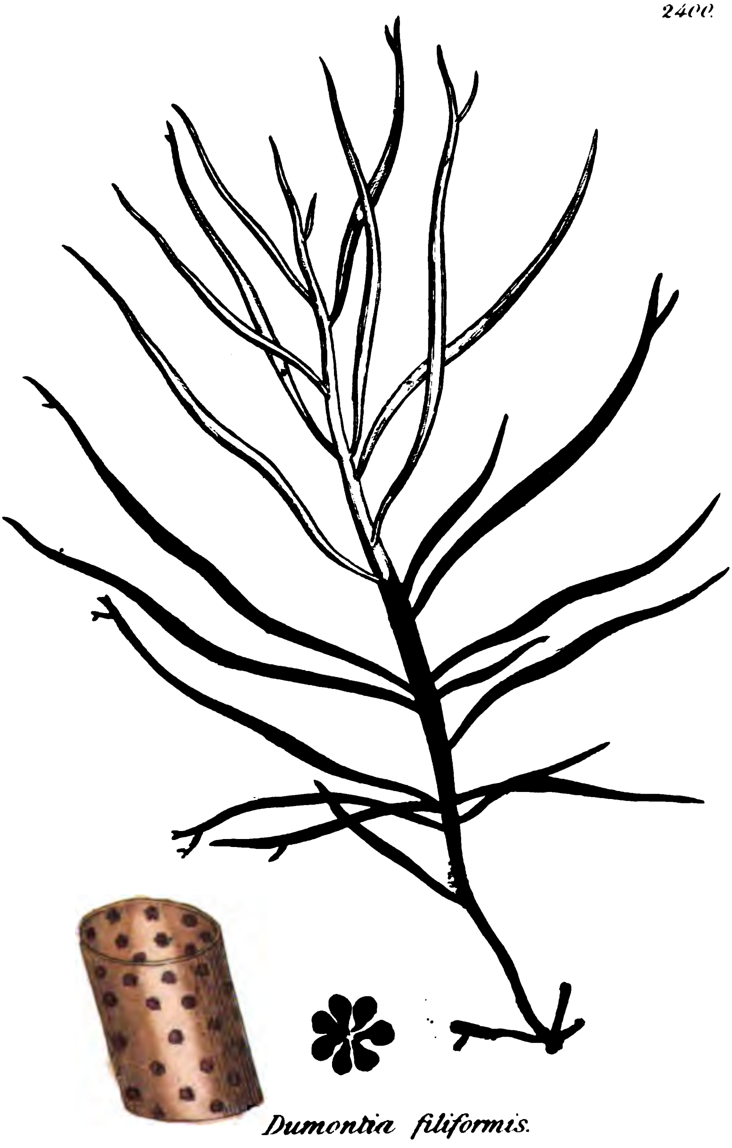
2399.



Halymenia farcellata.

May 1.1808. Publish'd by Jas. Sowerby London.

641
2400



Dumontia filiformis.

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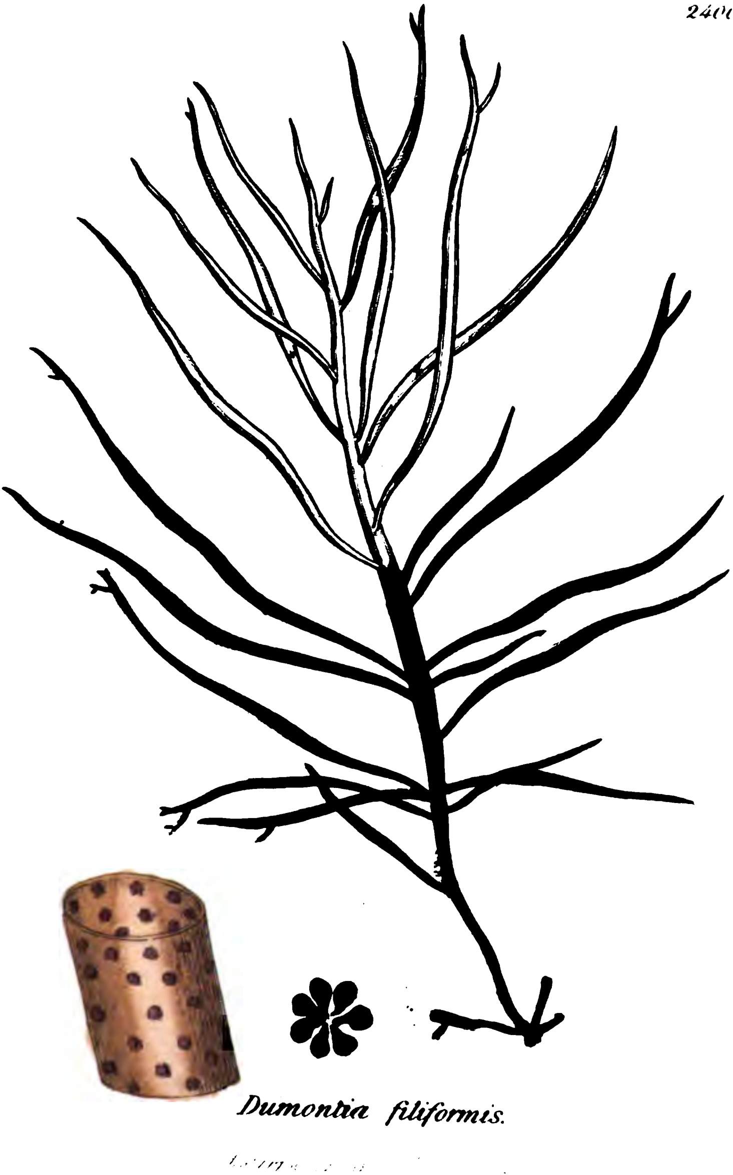
641

2400.



Dumontia filiformis.

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Frond mostly solitary, fixed by a minute scutate base, six inches to a foot or more in length, generally about the thickness of a small quill in the middle, but very much attenuated toward both extremities, set with numerous, mostly simple branches of a similar figure, in a somewhat distichous and subfastigiate manner, but inclining to pinnate, some short, others as long as the frond itself. Colour varying from a pale tawny-red to brownish or purple. Sporules ovate, subpyriform, attached in roundish clusters to the interior of the membranaceous coat of the frond, through which they are visible, giving it a speckled appearance to the naked eye. Annual. Fructification in the summer. Adheres firmly to paper in drying, and generally stains it pink, as well as the fresh water in which it is washed.

β. crispata. Frond compressed, waved, curled and twisted, of a brownish-purple colour. *Greville Alg. Brit.*165. Halymenia purpurascens, var. crispata, *Grev. Crypt. Fl. tab.* 240.
Found in the Friths of Forth and Clyde, Scotland.

GENUS DCL. CATENELLA. *Catenella.*

GEN. CHAR. *Fronds* filiform, somewhat compressed, creeping, throwing up numerous branches, contracted as if jointed in a moniliform manner; composed interiorly of branched filaments, radiating from the centre. *Fructification* unknown.

A single species, previously referred to almost as many different genera as there are authors who have catalogued and described it from actual observation, has been erected into a genus under the above title by Dr. Greville, and appended to his tribe of *Gastrocarpeæ*. The absence of distinct fructification and the curious internal structure of the frond, which has puzzled so many previous algologists, perhaps justifies its segregation, but not the allotment of the genus, that being unquestionably of a slightly higher grade than the rest of the tribe before us. Mr. Harvey, as quoted by Sir W. J. Hooker in the Cryptogamia of the 'English Flora,' considers the structure of *Catenella* accordant with that of *Chylocladia articulata,* a species to which it bears a very close resemblance in habit, the chief superficial characters of distinction being its smaller size and the less complex ramification of the frond: he found the pseudo-joints of the latter plant "full of very lax gelatine, in which articulated filaments appeared to be loosely floating, fixed only to the periphery, though," as presumed by him, "originating in a central point." This is so nearly correspondent to the tissue of *Catenella,* that the position, nay, the existence of the genus is at present precarious, as should external thecæ ever be discovered, *C. Opuntia* would probably be found to be a mere variety of *Chylocladia articulata.* The name, signifying a little chain, is expressive of the jointed character of the branches.

CATENELLA Opuntia. *Opuntia-like Catenella.* Tab. **2401**.

Rivularia Opuntia, *E. B.* 1868. Catenella Opuntia, *Greville Alg. Brit.* 166. *tab.* 17. *Hooker Crypt. Part* 1. 309. Chondria Opuntia, *Hooker Fl. Scot. Grev. Fl. Edin.* Halymenia Opuntia, *Agardh Spec. Alg.* 1. 217. Chordaria Opuntia, *Sprengel.* Lomentaria Opuntia, *Gaillon.* Gigartina Opuntia et pilosa, *Lamouroux.* Fucus Opuntia, *Goodenough and Woodward in Linn. Trans. Turner Hist. Fuc. tab.* 107. F. cæspitosus, *Stackhouse.* F. repens, *Lightfoot.* Ulva articulata, β. *Hudson.*

Such are the numerous synonyms under which this perplexing little plant has been noticed by different botanists. It is found upon most of our rocky shores, growing in small creeping tufts, densely matted and entangled, scarcely an inch in height. Fronds compressed, branched; the branches erect, contracted at intervals, as if jointed, or necklace-like. A transverse section under the microscope exhibits a semigelatinous mass, thickly intersected, except in the very centre, by a congeries of horizontal, repeatedly forked, jointed filaments, whose innumerable, gradually shorter, ultimate joints are full of red juice, while the primary ones are longer and colourless, meet at the surface of the external coat of the frond, and give it a dotted appearance,—a structure first noticed by Mr. J. D. Sowerby. The early examiners considered that they had discovered the sporules in these punctiform vesicles, and it is not improbable that they may be concerned in the propagation of the plant.

I have never met with the minute dark-coloured bodies, shown in our figure as occurring about the extremity of one of the magnified branches, which Mr. Turner and others have supposed might be a kind of fructification, and which Dr. Greville remarks as not unfrequent, at the same time expressing his opinion against their fulfilling any such office.

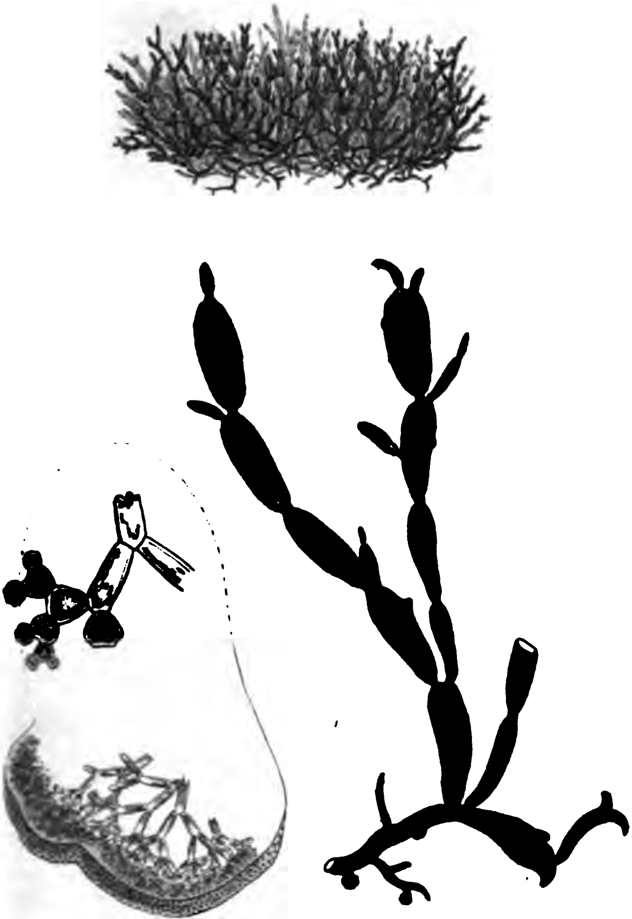
Perennial. Of a livid red or purple colour, becoming nearly black in drying. It does not adhere to paper.

Tribe XI. ULVACEÆ.

Plants found in the sea, in fresh water, on damp ground, &c.; of an herbaceous green or fine purple colour, of a thin, tender, membranaceous substance and reticulated structure, rarely gelatinous. Frond with a very minutely scutate base, expanded, or tubular and continuous. Fructification; roundish and mostly quaternate granules, or minute sporular grains imbedded in the delicate membrane of the frond.

1868

2401.



Catenella opuntia.

Apr. 1. 1808. Publish'd by Ja.s Sowerby London.

In this tribe the substance of the frond is composed of a single layer of more or less compressed cellules, forming a membranous expansion, sometimes flat, at others folded and connected by its margins, and then either inflated so as to become tubular, as in *Enteromorpha*, or with the folded sides pressed together and closely united so as to appear like a single membrane, though in substance composed of two cellular layers, as in the genus *Ulva*. The folded membrane however differs from the external part of the frond in *Gastrocarpeæ* in the greater laxity of its tissue, and in not containing any organized matter between its folds, the cavity, when such exists, being filled with air or water; added to which, the reproductive germs are developed within the vesicles of the membrane itself, not beneath it.

The tribe is not an extensive one, the alleged species at present known being fewer than forty, of which several may be only varieties, so difficult is it to define the limits between one and the other among plants thus low in the scale of organization. The distribution of the marine species seems to be wide, some being met with on the shores of almost every part of the world, but more in cold and temperate climates than between the tropics. Of the freshwater and terrestrial species really existing we know probably but a very small proportion.

Most of the *Ulvaceæ* are social plants, and they often overgrow considerable tracts of rock to the exclusion of all other species.

GENUS DCLI. PORPHYRA. *Porphyra. Purple Laver.*

GEN. CHAR. *Frond* plane, exceedingly thin, of a purple colour. *Fructification* of two kinds: scattered sori of oval sporules; or roundish granules, mostly arranged in a quaternate manner over the whole frond.

Marine plants, separated from the old genus *Ulva* by Agardh, on account of the purple colour of the species, which the name, from the Greek πορφύρα, indicates. The two forms of fructification are not found in any other genus of the tribe. Some of the species are exceedingly beautiful, the colour being occasionally very lively, but it is so fugitive that few specimens present it of a uniform tint, and it is generally supplanted in age or under exposure by a dirty green or brownish hue, and much care is requisite to preserve it in drying. The substance of the frond is tender and delicate, and the surface glossy as if varnished.

PORPHYRA LACINIATA. *Laciniated Purple Laver.* TAB. 2402.

Fronds aggregated, deeply cleft; the segments dilated, variously cut and waved.

Ulva umbilicalis, *Linn.* *E. B.* 2286. *Sprengel.* Porphyra laciniata, *Agardh Syst. Alg.* 190. *Greville Alg. Brit.* 168. *Hooker Crypt. Part* 1. 310. Ulva laciniata, *Lightfoot Fl. Scot.* 974. *tab.* 33. *Agardh Spec. Alg.* 1.404.

Common on the rocky parts of our coast, and abundant in many places, growing not only on rocks and stones, but upon the larger and coarser Algæ, wooden piles and other submersed substances, as is indeed the case with most of the marine *Ulvaceæ*. Fronds more or less aggregated, fixed by a minute disc, from which they sometimes extend in a suborbicular manner, whence the original name, *umbilicalis*, from a few inches to a span or more in length, and occasionally almost as wide, variously cut and lobed even to the centre or base, the margins crisped and wavy. Dark-coloured sori, consisting of minute, oval sporules, occur here and there, especially toward the margin of the segments; but the larger, roundish granules, arranged by fours, overspread the whole of the frond, and, as first observed by Dr. Greville, are the cause of its colour, as when they are removed it becomes colourless and diaphanous. Annual. In perfection throughout the summer.

Lightfoot informs us that "the inhabitants of the Western Isles gather it in the month of March, and after pounding and stewing it with a little water, eat it with pepper, vinegar and butter; others stew it with leeks or onions. In England it is generally pickled with salt, and preserved in jars; and when brought to table, is stewed and eaten with oil and lemon-juice." There is not sufficient substance in the edible *Ulvaceæ* generally to render them valuable as food, economically considered; hence they are more ordinarily eaten as a luxury, or taken by way of condiment.

Laver is the English name both of this genus of plants and the *Ulvæ* proper. In Scotland they are called Sloke.

PORPHYRA VULGARIS. *Common Purple Laver.*

Frond ovato-lanceolate; the margins more or less waved.

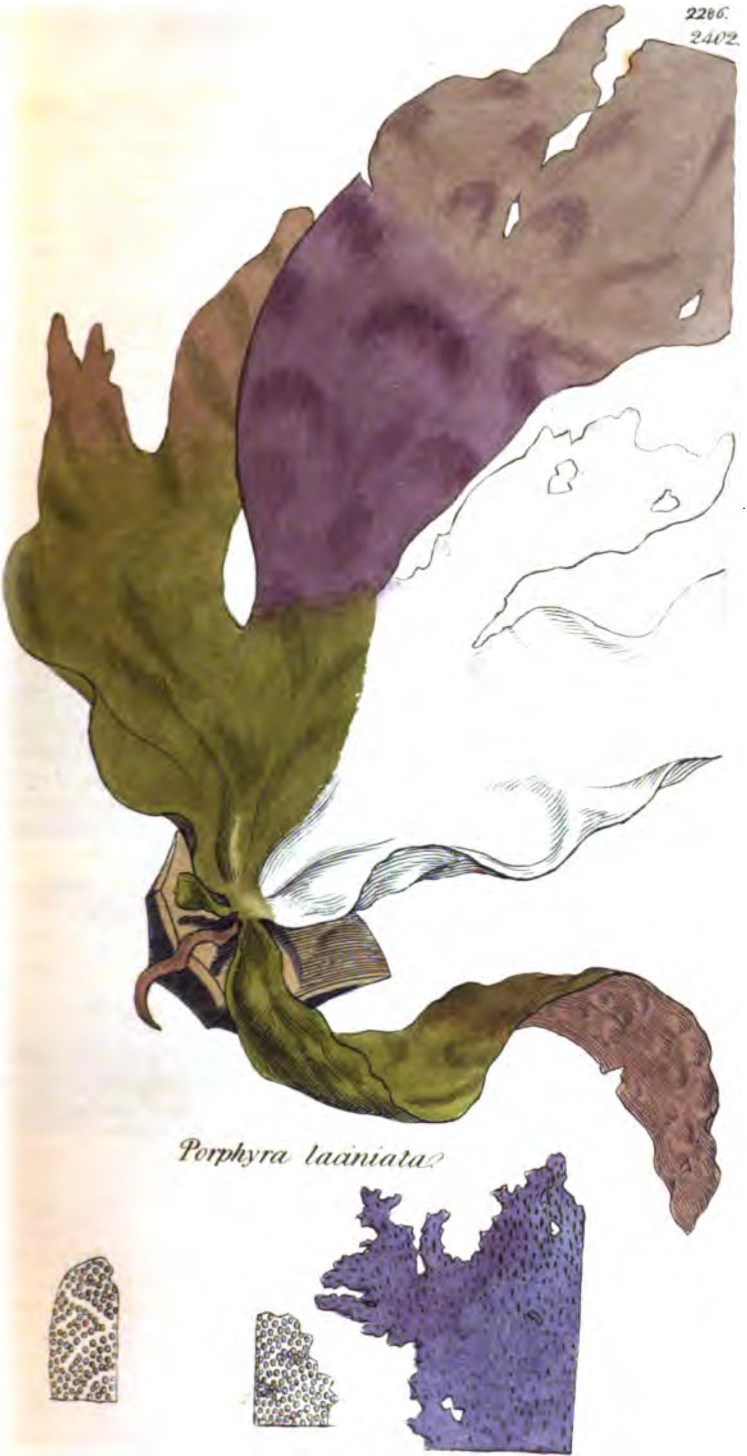
Porphyra vulgaris, *Agardh.* *Greville Alg. Brit.* 169. *Hooker Crypt. Part* 1.310. P. purpurea, *Agardh Syst. Alg.* 191. Ulva purpurea, *Agardh Spec. Alg.* 1.405. *Roth.* *Lyngbye Hydroph. Dan.* 29.

There does not appear any reason for the separation of this from the preceding: specimens collected in the same locality present every grade in figure between the two: the narrower the frond, generally speaking, the greater is its proportional length, and Dr. Greville mentions having seen a specimen "which measured no less than three feet and a half." He remarks that the quaternate granules in the present plant are about half the size only of those of *P. laciniata*, but surely this is no evidence against the unity of the species.

PORPHYRA LINEARIS. *Narrow Purple Laver.*

Frond linear or linear-lanceolate, acute; the margin nearly flat.

2286.
2402.

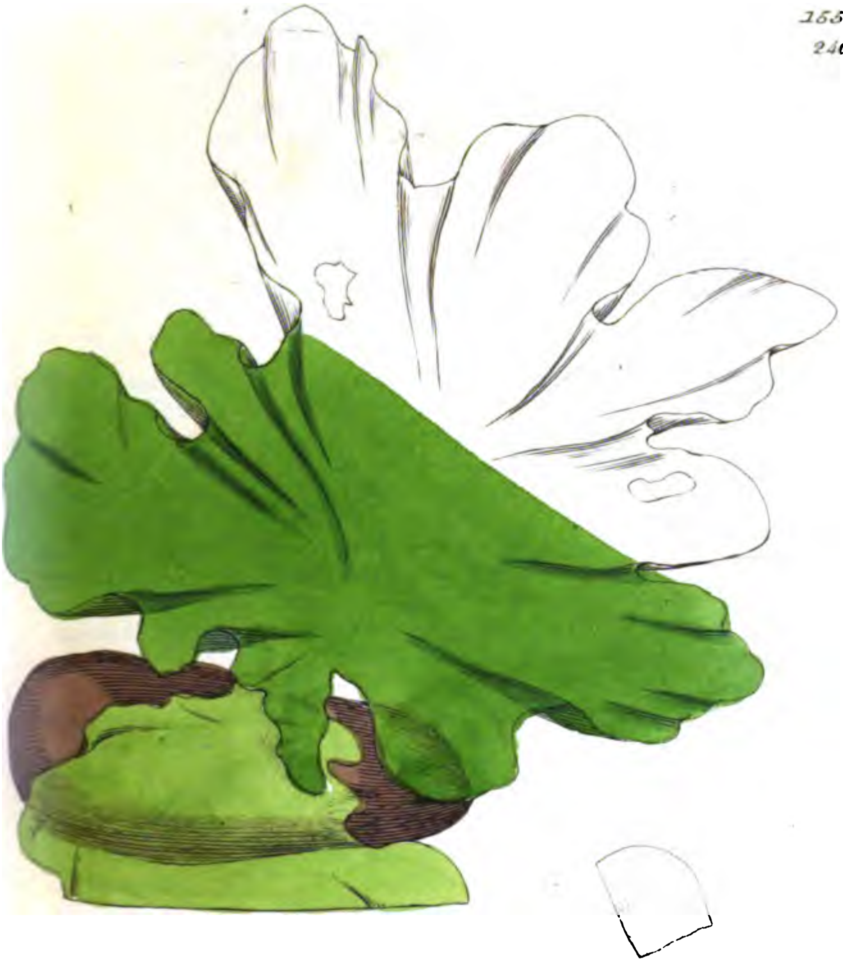


Porphyra laciniata

[illegible] published by J. Sowerby [illegible]

1551

2403.



Ulva lactuca.

Jan? 1. 1806 Published by Ja? Sowerby. London.

Porphyra linearis, *Greville Alg. Brit.* 170. *tab.* 18. *Hooker Crypt. Part* 1. 311. Ulva purpurea, var. elongata, *Lyngbye Hydroph. Dan.* 29.

Found abundantly by Dr. Greville on rocks beneath Peakhead, near Sidmouth, which "were rendered purple by its delicate fronds." Fronds aggregated, three to five inches in length, with an exceedingly short, but distinct stem; reddish-purple. Fructification, oval granules, not arranged in a quaternate manner, but partly scattered and partly in lines.

I only know this from Dr. Greville's figure and description, from which it appears to be a very beautiful and distinct species.

GENUS DCLII. ULVA. *Ulva. Green Laver.*

GEN. CHAR. *Frond* membranaceous, of a green colour, plane. *Fructification*, minute granules mostly arranged in fours.

In some cases the frond is saccate and inflated in the young state. This is one of the three genera in which the whole order of aquatic Algæ was included by Linnæus, and was distinguished from *Fucus* chiefly by the seeds or sporules being disposed singly under the cuticle or external coat of the frond, without any aperture for their dispersion, instead of being aggregated in tubercles or thecæ,—a character too indefinite to be retained under the improved system of arrangement adopted with our increasing knowledge of these once obscure plants, and indeed incorrect in most instances: hence it has shared the fate of the latter genus and *Conferva*, being broken up into several, and though the name is retained, its character remodelled to accord with the limit at present assigned. The name, *Ulva*, is one of uncertain derivation, unless, as suggested by De Theis, it is from the Celtic *ul*, water, and a term applicable to water-plants generally.

Of twelve species, seven are marine, two inhabit fresh water, and the remaining three are terrestrial, growing on damp ground, &c.

* *Marine.*

ULVA LATISSIMA. *Broad Green Laver. Oyster-green.* TAB. 2403.

Frond plane, widely oblong or roundish, waved, of a full green colour and very tender substance.

Ulva Lactuca, *Linn.* ? *E. B.* 1551. U. Lactuca, var. latissima, *Lightfoot.* U. latissima, *Linn. Fl. Suec. Greville Alg. Brit.* 171. *Hooker Crypt. Part* 1. 311. *Agardh Spec. Alg.* 1. 407.

Very common on rocks, stones, shells and other marine substances. Fronds generally clustered, fixed by a minute disc, erect or spreading, simple, divided or proliferous, often palmate, always dilated upwards, from a few inches to a foot or more in length, and sometimes nearly as broad. Very thin and tender: of a bright glossy-green colour. Granules quaternate, very minute, densely covering the whole frond. Annual. In perfection throughout the summer.

It does not adhere well to paper in drying, and shrinks very much.

As a vegetable it is far inferior to *Porphyra laciniata*, but is much used, dressed in a similar way with lemon-juice to counteract the salt, bitterish flavour. It is esteemed wholesome for scrophulous habits, containing probably a proportion of the same powerful principle, iodine, which is found in marine plants generally; but, according to Sir J. E. Smith, cannot be eaten in sufficient quantity to be very beneficial without acting too strongly on the bowels. Lightfoot states that the Scottish islanders ascribe to it an anodyne virtue, and bind the fronds about the forehead and temples to assuage the headache in fevers, and to procure sleep.

Found upon the shores of almost every country from the Arctic to the Antarctic oceans: in the Indian Archipelago and among the islands of the Pacific it is as common as with us.

ULVA LACTUCA. *Lettuce Green Laver.*

"Frond at first obovate, saccate, inflated, at length cleft down to the base; the segments plane, unequal, laciniated, semitransparent."

Ulva Lactuca, *Linn. Spec. Plant. Agardh Spec. Alg.* 1. 409. *Greville Alg. Brit.* 172. *Crypt. Fl. tab.* 313. *Hooker Crypt. Part* 1. 311.

Thinner and more delicate than the preceding, paler and semitransparent. When young it adheres closely to paper in drying.

In deference to others I introduce this as a species, but do not believe it distinct from *U. latissima*, from certain young states of which it is difficult, perhaps impossible, to clearly distinguish it. The specific name refers to the appearance of the tufted fronds, which when growing often resemble at first sight the cultivated endive or cabbage lettuce, but it is equally applicable to the preceding.

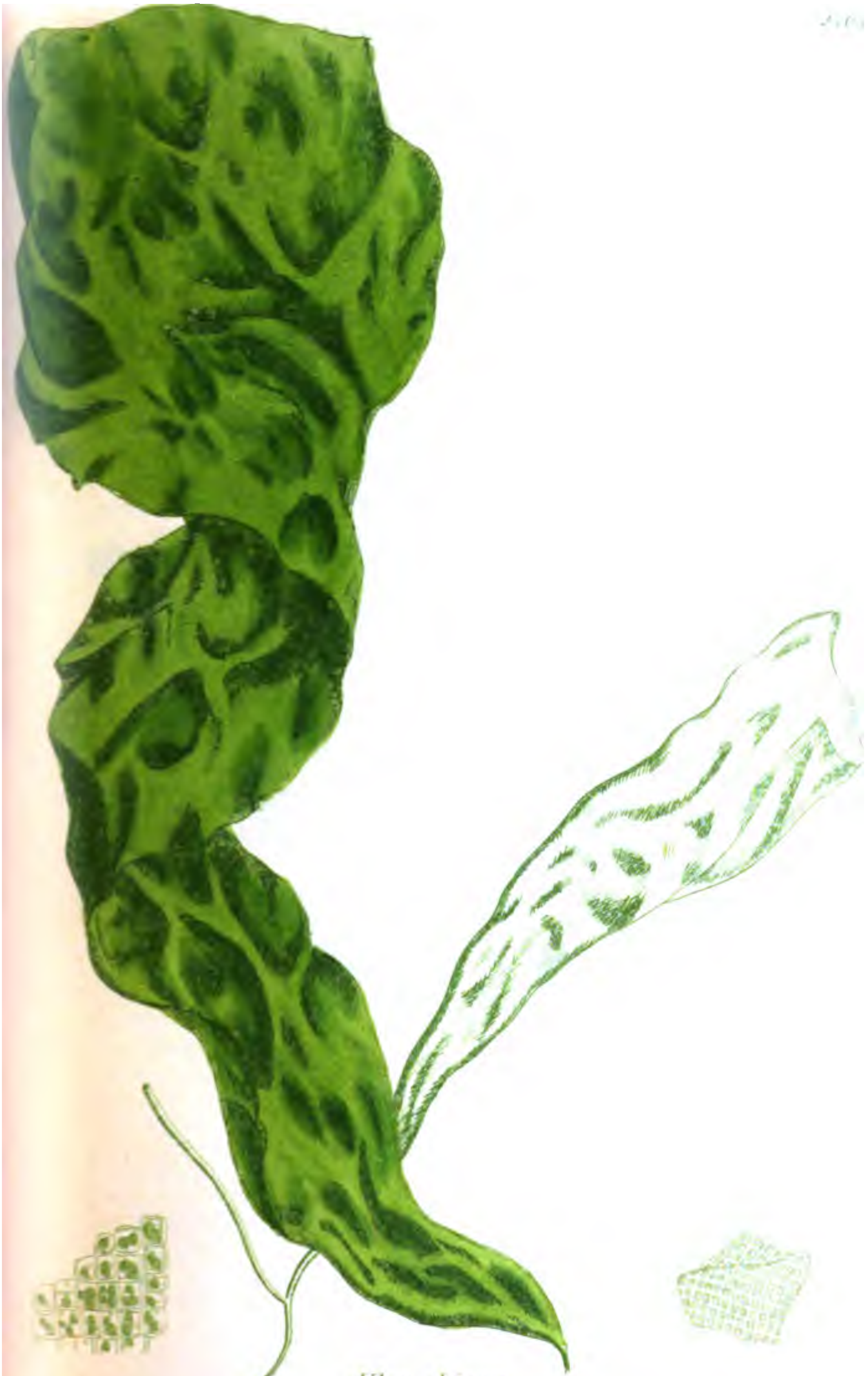
ULVA LINZA. *Riband Green Laver. Lanceolate Ulva.* TAB. **2404.**

Frond linear-lanceolate, attenuated at each extremity, waved at the the margin; composed of a double membrane.

Ulva Linza, *Linn. Berkeley in E. B. Supp.* 2755. *Greville Alg. Brit.* 173. *Hooker Crypt. Part* 1. 311. *Agardh Spec. Alg.* 1. 413. U. lanceolata, *Linn. Syst. Nat.* Solenia Linza, *Agardh Syst. Alg.* 185.

Frequent on rocks and stones in the sea, especially near the mouths of rivers and about freshwater springs. Fronds more less aggregated, linear-lanceolate, of a full, bright, herbaceous-green colour, fading in age, but not altering by careful drying; six to eighteen inches in length, and from two to five inches in breadth, the base

2755



Ulva Linza

October 1st 1832

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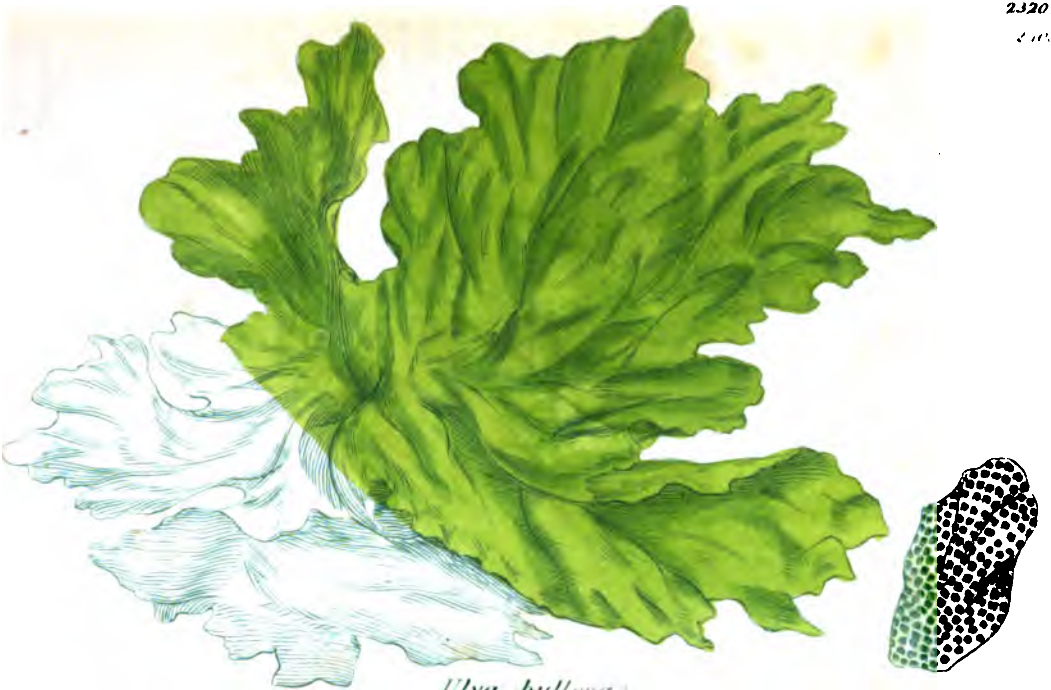


Ulva bullosa?

[illegible] published by Jas. Sowerby London

very fine and thread-like, occasionally giving off a single branch; the margin beautifully waved and curled. The lower part of the frond is tubular, but the tube gradually collapses until it becomes completely flattened, the sides cohering so closely as to appear a simple membrane; here and there however air-bubbles are formed within the plant by their partial separation. The membrane is regularly reticulated in squares, which run in right lines, each reticulation containing from one to four round granules. In drying it adheres incompletely to paper. Annual. In perfection throughout the summer.

This very beautiful and distinct species is rather doubtfully situated in respect to genus, between *Ulva* and *Enteromorpha.*

** *Freshwater.*

ULVA BULLOSA. *Blistered Green Laver.* TAB. **2405.**

Frond obovate, saccate, gelatinous, at length irregularly expanding, floating, waved and bullate.

Ulva bullosa, *Roth. E. B.* 2320. *Greville Alg. Brit.* 174. *Hooker Crypt. Part* 1. 312. *Agardh Spec. Alg.* 1. 414. Ulva Lactuca, *β. Hudson. Lightfoot.*

A frequent inhabitant of freshwater pools and ditches. The fronds somewhat resemble those of *U. Lactuca* in habit, but differ in texture and substance, being almost gelatinous, and scarcely to be touched without breaking and slipping through the fingers: in their young state they are fixed, obovate and saccate, but eventually lacerating and expanding into a plane surface: as the weather becomes warm in the advance of summer it is detached, floats on the surface, turns yellowish, and often has the appearance of being in a state of fermentation, in consequence of the air-bubbles disengaged from the water beneath. Fructification, quaternate granules scattered over the whole frond. Annual, disappearing by decay in the autumn.

*** *Terrestrial: growing on damp ground, walls, rocks, &c.*

ULVA CRISPA. *Crisped Green Laver. Ground Ulva.* TAB. **2406.**

Fronds densely crowded, deep green, rounded, inflated, much plaited and wrinkled.

Ulva crispa, *Lightfoot. Berkeley in E. B. Supp.* 2754. *Greville Alg. Brit.* 176. *Hooker Crypt. Part* 1. 312. *Agardh Spec. Alg.* 1. 406. U. terrestris, *Roth.* U. Lactuca, *γ. Hudson.*

Common on moist shady ground, especially near houses and walls, sometimes on old thatched roofs. Fronds very much crowded, forming a dense stratum scarcely an inch in thickness, rather lying on the soil or medium than attached to it; deep green, rounded, thin, tender, but not gelatinous, variously curled and folded. Quaternate granules beautifully arranged in squares, contained in larger ones, and separated by parallel pellucid lines, the whole compared by Agardh to the walks and parterres of a garden. Annual. Found throughout the winter and early spring.

Mr. Berkeley remarks, that although considered common, there are many parts of England in which it does not occur.

ULVA FURFURACEA. *Scurfy Green Laver.*

Fronds very minute, roundish-ovate, distinct, suberect, forming a thin crowded stratum.

Ulva furfuracea, *Fl. Dan. tab.* 1489. *Greville Alg. Brit.* 176. *tab.* 18. *Crypt. Fl. tab.* 265. *Agardh Spec. Alg.* I. 417. *Hooker Crypt. Part* 1. 312.

This minute *Ulva* grows at all seasons on rocks, walls, and even on planks of wood, in damp shady places: it was first observed as a British species by Captain Carmichael, "on the tops of a few of the large boulders near the high-water line, and on a rock by the side of one of the lakes of Lismore." The Rev. Mr. Berkeley found it on the walls of King's College, Cambridge. Fronds crowded, forming a thin, vivid green stratum, somewhat erect, roundish-obovate, attenuated into a stem below, truncated or slightly lobed at the top, frequently inflexed. Quaternate granules mostly in squares with vacant intervals. Does not adhere to paper.

ULVA CALOPHYLLA. *Delicate Green Laver.*

Fronds cæspitose, minute, dilated from a capillary base into a plane or twisted linear membrane, marked with 4–12 longitudinal lines. Granules biseriate in each stria.

Ulva calophylla, *Sprengel. Greville Crypt. Fl. Synopsis* 42. *Alg. Brit.* 176. *Hooker Crypt. Part* 1. 312. Bangia calophylla, *Carmichael in Grev. Crypt. Fl. tab.* 220.

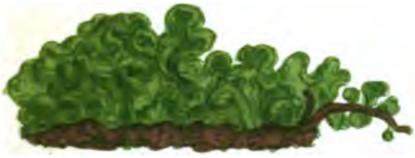
Found in the month of October by Captain Carmichael, covering with a dark green, velvet-like stratum, the surface of a block of stone near the clergyman's house in the island of Lismore. The appearance of lines upon the surface of the frond is due to the fructification, the granules being arranged longitudinally, each line consisting of a double series; on very narrow, filament-like fronds there is often only one line, on broader from two to ten or twelve.

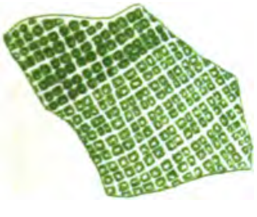
GENUS DCLIII. TETRASPORA. *Tetraspora.*

GEN. CHAR. *Frond* tubular or inflated, gelatinous. *Fructification*, minute granules loosely arranged in fours.

The gelatinous substance and very obscure structure of the frond distinguish this from both *Ulva* and *Enteromorpha*. The name, from *τέτρα*, *four*, and *σπορὰ*, *seed*, alludes to the arrangement of the granules.

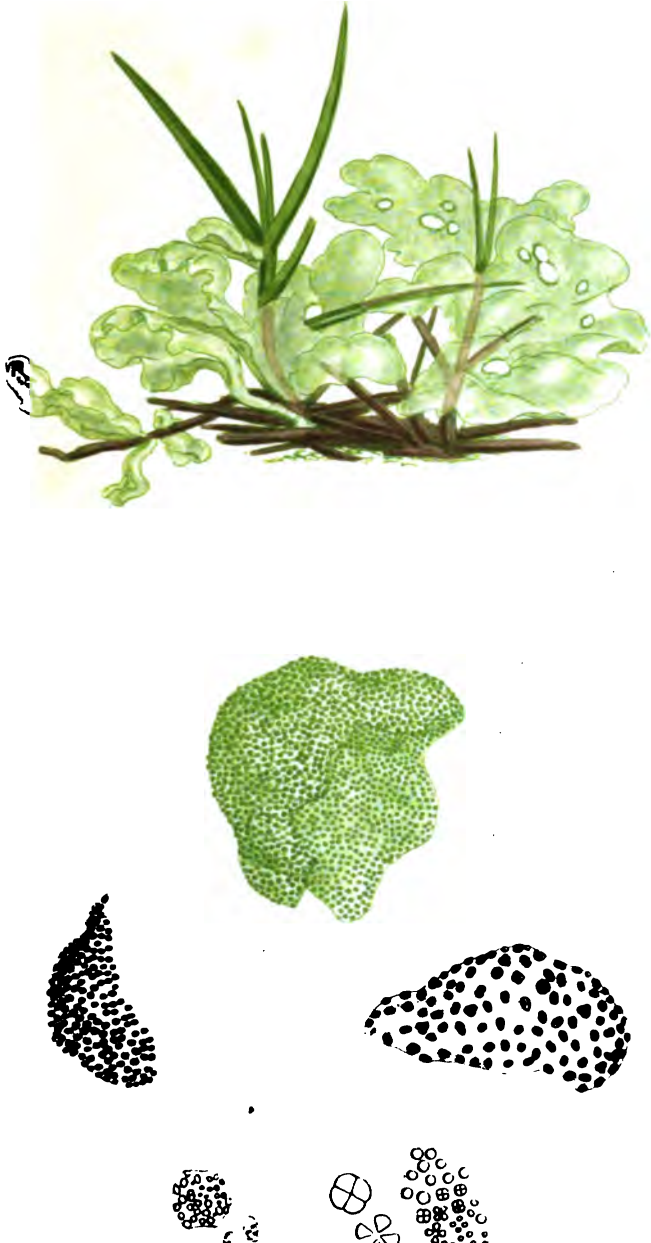
The species grow in freshwater springs and rivulets.





Ulva crispa.

October 1st 1832



Tetraspora lubrica?

Sept. 1st 1838.

TETRASPORA LUBRICA. *Lubricous Tetraspora.* TAB. 2407.

Frond quite simple, at first convolute, subgelatinous, waved, sinuated, more or less perforated.

Tetraspora lubrica, *Agardh Syst. Alg.* 188. *Berkeley in E. B. Supp.* 2825. *Hooker Crypt. Part* 1. 313. Ulva lubrica, *Roth. Agardh Spec. Alg.* 1. 415. Rivularia lubrica, *DeCandolle Fl. Fr.* Gastridium lubricum, *Lyngbye.*

Found in gently running fresh water in various parts of the kingdom; certainly not unfrequent. The fronds grow in rather dense, irregular masses; they are from one to two inches in length, at first linear and convolute, but not truly tubular, at length more or less expanded, oblong, waved and sinuated, pierced here and there with round lacunæ, whose borders are slightly thickened. Fructification consisting of subglobose granules arranged in fours. These arise, as observed by Mr. Berkeley, from larger globose granules which split into four, and gradually assume a subglobose or oval form. In old plants the quaternary arrangement is no longer visible, and the granules, viewed under a high power, are seen to contain about three minute globose bodies.

TETRASPORA GELATINOSA. *Gelatinous Tetraspora.*

Frond vesicular, ovate, clavate, very gelatinous.

Tetraspora gelatinosa, *Desvaux. Hooker Crypt. Part* 1. 313. *Agardh Syst. Alg.* 138. Ulva gelatinosa, *Vaucher Conferv.* 244.

Found by Mr. Harvey in a freshwater stream at Mucruss, Killarney. Resembling frog's spawn, but of a green colour, with quaternate granules. Its vegetable character is doubtful, as well as that of some others of the genus.

GENUS DCLIV. ENTEROMORPHA. *Enteromorpha.*

GEN. CHAR. *Frond* tubular, membranaceous, of a green colour and reticulated structure. *Fructification*; three or four roundish granules, aggregated in the reticulations.

The name of this genus, derived from the Greek ἔντερον, *the entrail*, and μορφὴ, *a form*, is characteristic of the appearance of the frond, which in some of the species resembles in figure the entrails of an animal. The principal character of distinction between it and *Ulva* consists in the membrane being tubular during all the stages of growth. Plants all annual, in perfection throughout the summer. The distribution of the species is as wide as that of the *Ulvæ*, and they seem equally independent of climate; most of them are exclusively marine, but some, as our *E. intestinalis*, are capable of flourishing in fresh water likewise: the same plant affords an example, too, of the great diversity in size and appearance to which they are liable, varying as it does in length from two or three inches to three feet, and in diameter from four inches to the fineness of a hair, and still, even in the latter case, bearing the complete characters of the species.

Some of the *Enteromorphæ* are very near the *Confervoideæ* in habit.

ENTEROMORPHA INTESTINALIS. *Intestine-like Enteromorpha.* TAB. 2408.

Frond elongated, simple, inflated, sinuated.

Enteromorpha intestinalis, *Link.* *Berkeley in E. B. Supp.* 2756. *Greville Alg. Brit.* 179. *Hooker Crypt. Part* 1. 313. Solenia intestinalis and S. Bertolini, *Agardh Syst. Alg.* *Sprengel.* Ulva intestinalis, *Linn.* *Hudson.* *Agardh Spec. Alg.* 1. 418. Scytosiphon intestinalis, *Lyngbye.* Fistularia intestinalis, *Grev. Fl. Edin.* Ilea intestinalis, *Gaillon.* Tetraspora intestinalis, *Desvaux.* Conferva intestinalis, *Roth.*

Common on the sea-shore and in tide rivers, and ditches connected with them, whether salt, brackish or fresh water; sometimes found at a considerable distance from the sea, as in the Trent, near Derby. At first attached by a small scutate base, often broken off and floating in dense, intricate masses, which look as if in a state of fermentation in consequence of the air contained in the irregular tubes. Frond very slender at the base, enlarging gradually upwards, the extremity obtuse, variously waved, crisped and indented, frequently constricted in places. Substance membranaceous, rather irregularly reticulated. The colour varies from a bright herbaceous green to a pale, almost yellow hue. In drying it does not adhere firmly to the paper.

Specimens are occasionally met with having a tendency to branch, as represented on our Plate; and it is sometimes proliferous, especially when broken or injured, as shown in the central figure.

The diversity of form and size which it exhibits has been already referred to in the observations upon the genus; the fronds are sometimes so slender and hair-like as to resemble those of a green *Conferva.*

A remarkable variety, *β. crispa* of Dr. Greville, *Solenia intestinalis,* var. *crispa* of Agardh, has the "frond compressed, the margin crisped and curled." "It generally grows solitary, attaining the length of five or six feet, and upwards of two inches in diameter."—*Hooker.*

ENTEROMORPHA COMPRESSA. *Compressed Enteromorpha.* TAB. 2409.

Frond subcompressed, simple or branched; the branches elongated, attenuated at the base.

Ulva compressa, *Linn.* *E. B.* 1739. *Agardh Spec. Alg.* 1. 420. Enteromorpha compressa, *Greville Alg. Brit.* 180. *tab.* 18. *Hooker Crypt. Part* 1. 314. Solenia compressa, *Agardh Syst. Alg.* *Sprengel.* Fistularia compressa, *Grev. Fl. Edin.*

Common on rocks, stones and other substances in the sea, and about the mouths of rivers, but never in fresh water. The fronds

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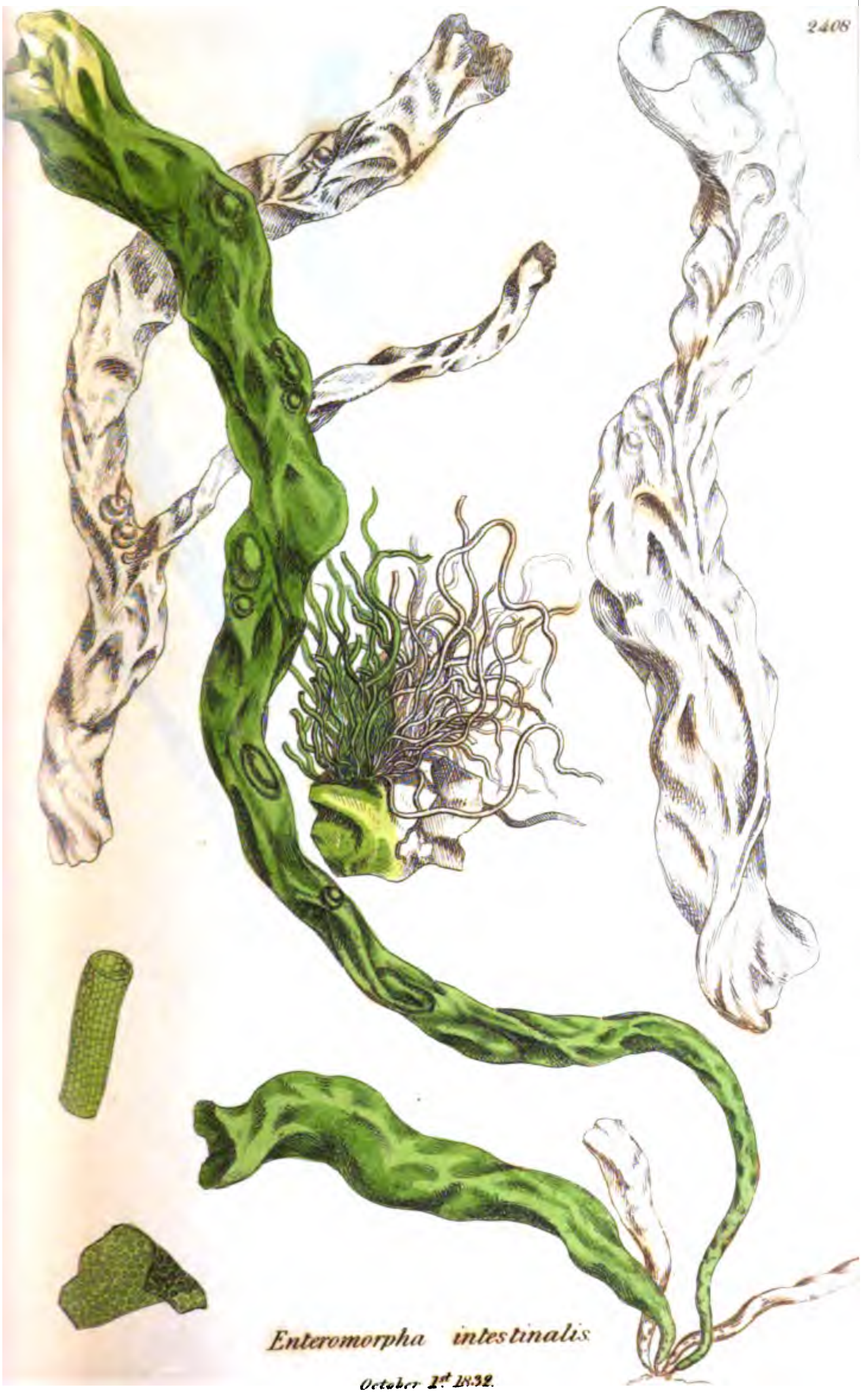
2408



Enteromorpha intestinalis

October 1st 1832.

1739

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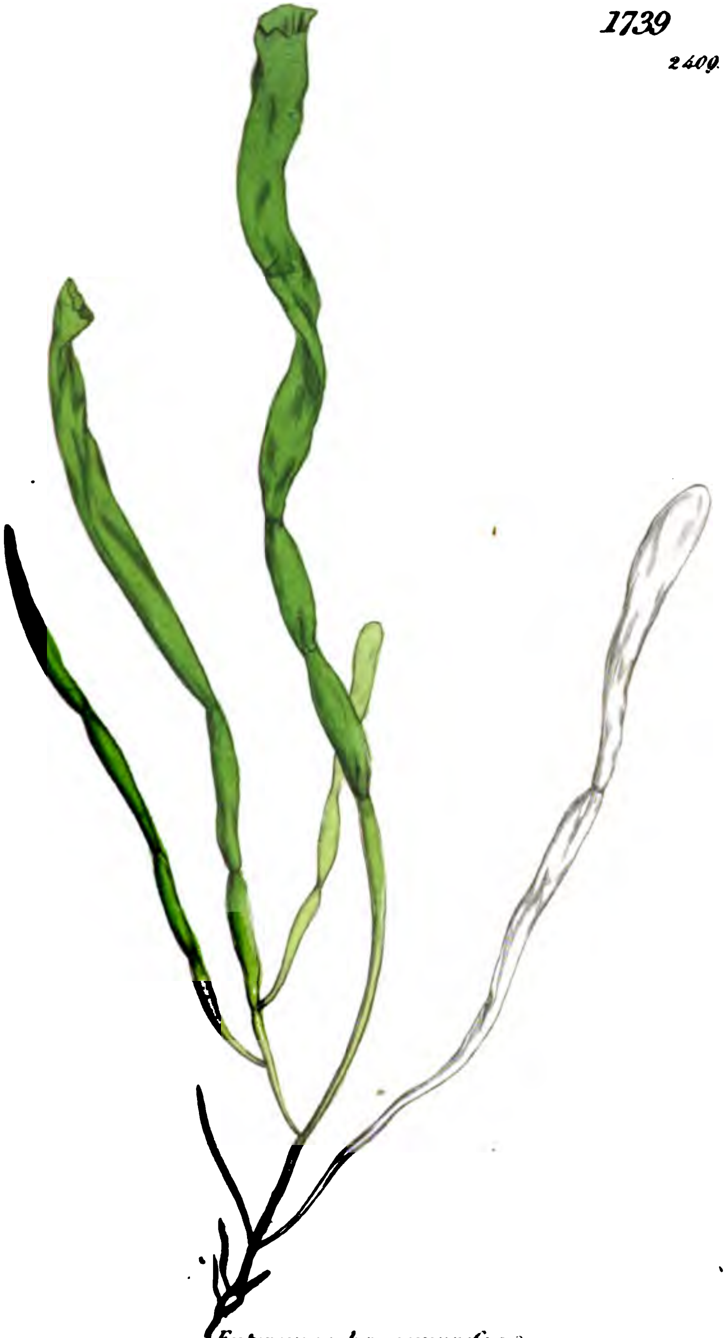

Enteromorpha compreſsa ?

May 1 1807 Publish'd by Jas Sowerby London

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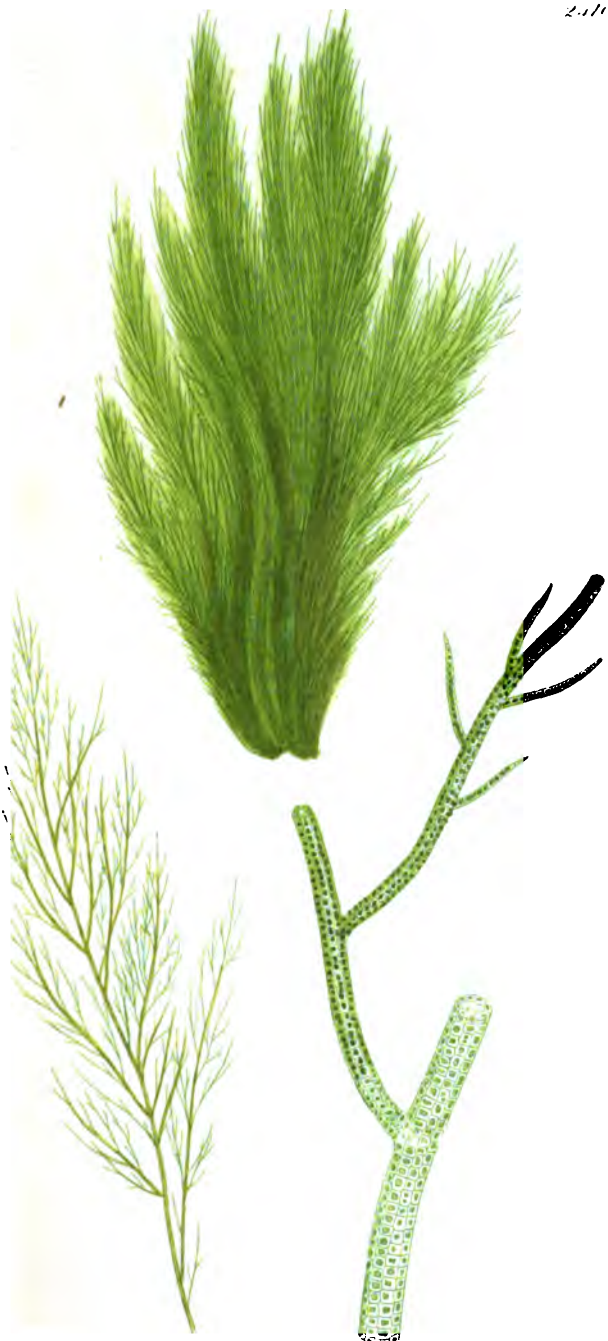

Enteromorpha clathrata ?

[illegible] by J. Sowerby Lond.

grow in tufts, and are very slender at the base, where they are most branched: branches greatly enlarged upwards, tubular, but compressed, constricted here and there at irregular intervals, somewhat attenuated at the apex. In colour, texture, and imperfect adhesion to paper it agrees nearly with *E. intestinalis*, and is equally variable in size: it is difficult among the numerous varieties of each to decide in what the specific distinction consists. It is found in all parts of the ocean.

Although of a less tender substance than *Ulva latissima*, they are collected indiscriminately as food by the Sandwich Islanders.

β. prolifera. Frond somewhat inflated, throwing out capillary branches on all sides. Ulva prolifera, *Fl. Dan. tab.* 763. *fig.* 1.

ENTEROMORPHA LINKIANA. *Link's Enteromorpha.*

"Frond cylindrical, tubular, filiform, reticulated, pellucid, of a very pale green colour, membranaceous (rigid when dry), much-branched; branches attenuated."

Enteromorpha Linkiana, *Greville Alg. Brit.* 182. *Hooker Crypt. Part* 1. 314.

Found in the sea, on the coast of Appin, Argyleshire, by Captain Carmichael. "The specimens of this in Captain Carmichael's herbarium do not appear to me to differ from a not unfrequent state of *E. compressa*, except in being a little more rigid than is usual with that species."—*Hooker.*

ENTEROMORPHA CLATHRATA. *Chequered Enteromorpha.* TAB. 2410.

Frond chequered, filiform, irregularly branched and interwoven; the branchlets divergent or recurved.

Conferva paradoxa, *Dillwyn Brit. Conf. Syn.* 70. *tab. F. E. B.* 2328. Enteromorpha clathrata, *Greville Alg. Brit.* 181. *Hooker Crypt. Part* 1. 315. Solenia clathrata, *Agardh Syst. Alg.* 186. *Sprengel.* Scytosiphon paradoxus, *Fl. Dan. tab.* 1595. *fig.* 2. S. clathratus, *Lyngbye Hydroph. Dan.* 66. *tab.* 16. Conferva clathrata, *Roth.*

Found on various parts of the sea-coast, and probably not uncommon. The fronds form dense tufts, four or five inches in length, of a light yellowish-green hue and tender membranaceous substance; they are filiform, cylindrical, about the thickness of a bristle, repeatedly and alternately branched. Under the microscope it is beautifully reticulated so as to appear like lattice-work, the fructifying granules being contained in the centre of the reticulations. The fine, somewhat glossy, interwoven tufts adhere slightly to paper.

ENTEROMORPHA ERECTA. *Erect Enteromorpha.*

Frond chequered, filiform, tender; the branches and branchlets attenuated, erect, free.

Enteromorpha erecta, *Carmichael in Hooker Crypt. Part* 1. 314. *E. clathrata, β. Greville Alg. Brit.* 181. Scytosiphon erectus, *Lyngbye Hydroph. Dan.* 63. *tab.* 15. Solenia clathrata, var. confervoides, *Agardh Syst. Alg.* 187. Fistularia erecta, *Grev. Fl. Edin.*

Found in several places on the coast of Scotland. Although this plant stands in the 'Algæ Britannicæ' as a variety of the preceding, Dr. Greville is inclined to consider it a distinct species; and Captain Carmichael, as quoted by Sir W. J. Hooker, remarks that *E. erecta* is "erect, with long, equal, loose and disentangled branches," while *E. clathrata* is "prostrate, with branches of all lengths interwoven into a matted web."

ENTEROMORPHA RAMULOSA. *Branchleted Enteromorpha.* TAB. 2411.

Frond chequered, compressed, twisted divaricatedly, very much branched and interwoven, everywhere set with spinulose branchlets. Ulva ramulosa, *E. B.* 2137. Enteromorpha ramulosa, *Carmichael in Hooker Crypt. Part* 1. 315. E. clathrata, γ. uncinata, *Greville Alg. Brit.* 181.

First found by Miss Hutchins in Bantry Bay, but certainly not rare. Fronds tufted, repeatedly branched, compressed, twisted, very much interwoven, set on all sides with short spine-like branchlets. Substance membranaceous, tender. Colour darkish green.

Dr. Greville observes that our figure "is a very inadequate representation of the plant, as it is sometimes above a foot in length, and the branches are generally quite capillary," but it is as variable in this respect as are the rest of the *Ulvaceæ*, some specimens before me being not more than two or three inches long; the magnified portion is however so far in error that it does not show the clathrated or chequered texture.

Sir W. J. Hooker remarks that there are intermediate states of this and the two preceding which would induce him to unite them, as they are by Dr. Greville in the 'Algæ Britannicæ.' "In the ramification they are extremely variable, in the clathrate or latticed structure of the frond (by which they are distinguished from all others of the genus) very uniform and constant."

GENUS DCLV. BANGIA. *Bangia.*

GEN. CHAR. *Frond* flat, capillary, membranaceous, of a green, reddish or purple colour. *Fructification*, granules arranged more or less in a transverse manner.

This genus, named by Lyngbye in honour of his friend Hoffmann Bang, a Danish naturalist, seems to stand well as a connecting link between the *Ulvaceæ* and *Confervoideæ*, to the latter of which it had been assigned by most algologists until Dr. Greville removed it hither, on account of the plane character of the frond, and the near approach of its cellular texture to that of *Ulva calophylla* and *U. velutina*. "Like them," he remarks, "the *Bangiæ* are very apt to vary in the width of the fronds, and often even in the same frond. When

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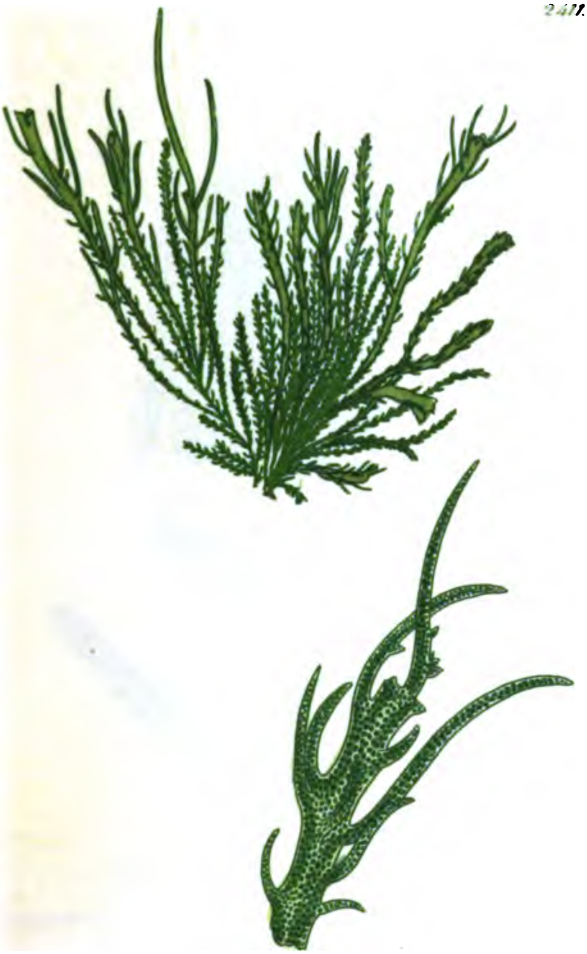
2411.



Enteromorpha ramulosa.?

Apl 1810 published by Js Sowerby London.

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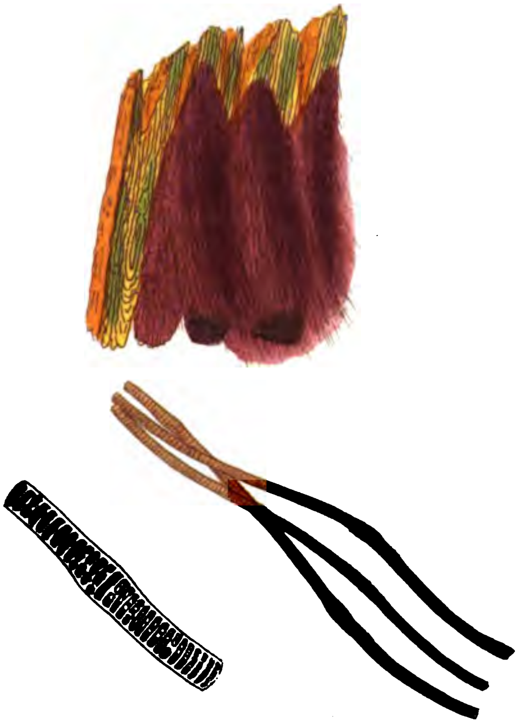

Bangia fusco-purpurea?

Sep 1 1809 publish'd by Jas Sowerby London.

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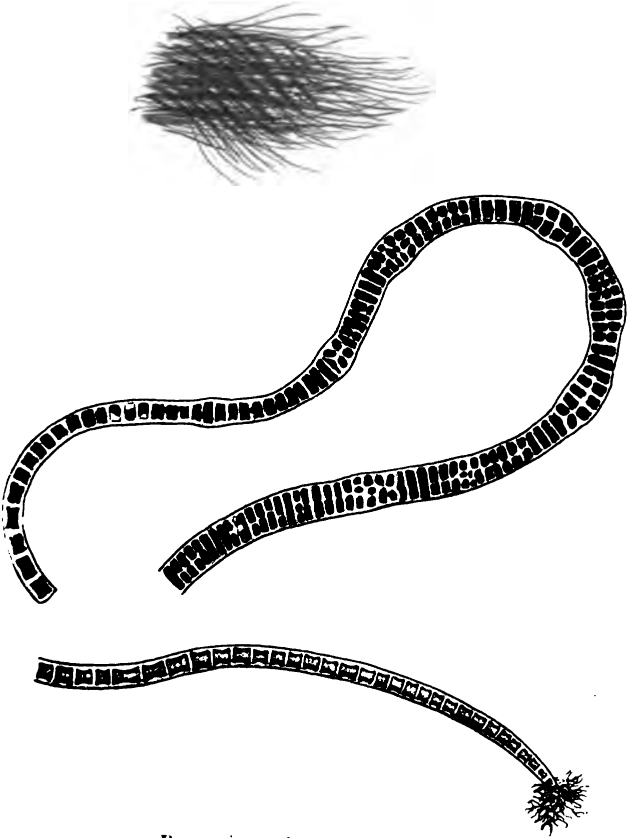
2413



Bangia atro-purpurea !

Nov. 1 1809 Published by Jas Sowerby London.

a frond is so narrow as to contain only one series of cellules, it has much the appearance of a *Conferva*, the cellules having the aspect of joints; the granules under similar circumstances are sometimes so uniform as to look like annular bodies within a tube, and then it resembles an *Oscillatoria* or a *Scytonema*."

The species, with the exception of *B. fusco-purpurea*, have been little examined, and are but imperfectly distinguished, whence the limits of the genus are uncertain; most of those hitherto referred to it are marine, growing on rocks about high-water mark, or epiphytic on aquatic plants.

BANGIA FUSCO-PURPUREA. *Brownish-purple Bangia.* TAB. **2412.**

Fronds capillary, simple, purple or brownish-purple, often waved and crisped at the extremity. Granules densely arranged.

Conferva fusco-purpurea, *Dillwyn Brit. Conferv. tab.* 92. *E. B.* 2055. Bangia fusco-purpurea, *Lyngbye Hydroph. Dan.* 83. *tab.* 24. *Greville Alg. Brit.* 177. *Hooker Crypt. Part* 1. 316. *Sprengel.*

It covers rocks and wooden piles on the sea-shore, about high-water mark, chiefly on the south coast of England and Ireland. Fronds very slender, hair-like, thickly clustered and entangled, glossy, purplish-brown, simple, from one to three inches in length, uniform in diameter at first, but eventually enlarging here and there at irregular intervals, the cellules or vesicles being mostly in a single longitudinal series, but doubled or tripled where the enlargement takes place. As the plant advances to maturity, the purple endochrome separates into more or less globose granules.

The fronds are fixed individually by a bunch of small fibres, and often cover rocks scarcely within reach of high-tide in patches of several feet in extent, apparently preferring spots where they can be kept moist by the spray of the sea, to those in which they are liable to frequent submersion; such is the case, at least, in most habitats in which I have had the opportunity of observing it.

BANGIA ATRO-PURPUREA. *Dark-purple Bangia.* TAB. **2413.**

Scarcely sufficiently distinct from the preceding to constitute a variety, far less a species. Found in similar habitats. Of a deep purple colour.

The following species are added in the 'Cryptogamia' of Sir W. J. Hooker:—

Bangia ciliaris. "Filaments (fronds) gregarious, very minute, simple, straight, compressed, purple. Granules binate, globose."

Found by Captain Carmichael, forming a delicate pink-coloured fringe on the edges of old leaves of *Zostera marina*, on the sea-shore about Appin, Argyleshire, in the spring.

Bangia Laminariæ. "Filaments simple, cæspitose, olive-green. Granules minute, arranged in a double series of about four."—*Lyngbye Hydroph. Dan.* 84. *tab.* 24.

Found by Captain Carmichael, occurring in little stellated tufts on *Ulva Lactuca*, on the coast about Appin, in the autumn.

Bangia? læte-virens. "Filaments minute, tufted, flexuose, attenuated to a subobtuse point, bright green. Fasciæ close, composed of innumerable minute granules."

Found by Mr. Harvey on old fronds of *Enteromorpha intestinalis*, at Miltown Malbay, Ireland, in the summer.

Bangia lacustris. "Filaments scattered, decumbent, branched, deep green; the branches divaricated, acute. Fasciæ of ternate globose granules."

Found by Captain Carmichael, growing on the submerged leaves of aquatic plants.

TRIBE XII. SIPHONEÆ.

Plants found in the sea, in fresh water, on damp ground, &c., of an herbaceous-green colour. Frond either composed of membranaceous, filiform, continuous, simple or branched tubes, or formed of a combination of similar tubes, and then presenting a lax, spongy body of various forms, crustaceous, globular, cylindrical or flat. Fructification; vesicles (*Coniocystæ* of Agardh) produced on the outer surface of the tubes, filled with a dark green, granular mass.

The genera associated in this tribe have little affinity with each other, except in their uninterrupted tubular structure, without any trace of cells or reticulations, and herbaceous-green colour. In habit they approach the *Confervoideæ*, *Vaucheria* especially; but the resemblance extends no farther, the frond presenting no appearance of articulation, and the fructification, so far as it has been hitherto recognised, being altogether different. It is therefore only with the *Oscillatoriæ* and their kindred groups, whose vegetable character is doubtful, that the species of this obscure family can be compared. Some of them, as *Codium*, give out an animal smell in burning, and their texture is rather horny than membranaceous, or resembling that intermediate substance constituting the outer covering of certain zoophytes belonging to the class of *Polypiaria*: while others manifest, in one stage of their existence at least, a power of vital motion very much at variance with the ordinary quietude of vegetable growth. Indeed, taken collectively, the tribe is a very equivocal one, and its place here is rather provisional than decided. On *Bryopsis* and *Botrydium* no fructification has yet been observed.

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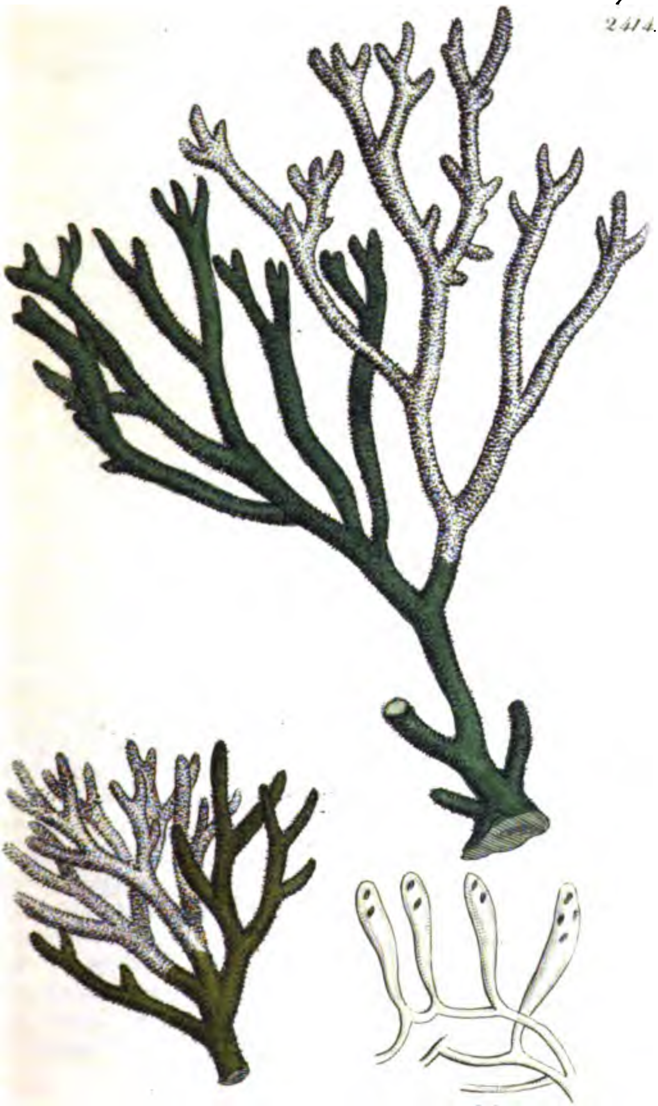
2414.



Codium tomentosum?

[illegible]

GENUS DCLVI. CODIUM. *Codium.*

GEN. CHAR. *Frond* spongy, dark green, crustaceous, globular, cylindrical or flat, composed of an interwoven mass of tubular, continuous filaments. *Fructification*; opake vesicles, attached to the filaments near the surface of the frond.

According to Dr. Greville the distribution of *Codium* is almost universal, *C. tomentosum* especially being found in the Atlantic, from the shores of England and Scotland to the Cape of Good Hope; in the Pacific from Nootka Sound to the southern coast of Australia. It abounds in the Mediterranean, on the shores of France, Spain and Africa, and is common in the Adriatic. More recently it has been also brought from the coasts of Chili and Peru.

However variable in form, the structure of the species is similar throughout. Having somewhat the appearance of sponge, and destitute of cuticle, the frond is found upon examination to consist of numerous, intricately branched, tubular filaments, forming a sort of network, from which short, crowded, equal, mostly club-shaped ramuli extend in a vertical direction and parallel to each other, their apices constituting the surface of the mass. The filaments of the interior are mostly colourless and transparent, but the outer club-shaped ramuli contain more or less of a green endochrome, which toward the apex is generally condensed here and there into minute, dark green granules. The fructification appears to be nothing more than a modification of similar or secondary ramuli, in which the endochrome becomes denser, and the clavate summit eventually deciduous; on their first appearance they are evidently branches of the same continuous tube with the rest of the frond.

The above remarkable structure renders these plants soft and woolly or downy to the touch; hence the generic name, originally bestowed by Stackhouse, from the Greek *κῴδιον*, *the skin of an animal.* By Lamouroux they were named *Spongodium*, from their sponge-like substance and capability of imbibing water. Some naturalists have referred them to the animal kingdom. The species, seven in number, are all marine.

CODIUM TOMENTOSUM. *Downy Codium.* TAB. **2414.**

Frond cylindrical, branched from the base, dichotomous.

Fucus tomentosus, *Hudson.* *E. B.* 712. *Turner Hist. Fuc. tab.* 135.

Codium tomentosum, *Stackhouse*. *Greville Alg. Brit.* 185. *tab.* 19. *Hooker Crypt. Part* 1. 318. *Agardh Spec. Alg.* 1. 452. *Sprengel.* Spongodium tomentosum, *Lamouroux*. S. commune, *Bory*.

Abundant on the southern coasts of England and Ireland, comparatively rare in the north. The fronds spring erect from a broadish, spreading, velvety base, somewhat resembling mole-skin to the touch; they are from two or three inches to a span in height, repeatedly branched in a dichotomous manner, cylindrical, or but very slightly compressed, deep green, and apparently clothed with a soft, velvet-like down, arising from the peculiar structure which characterizes the genus. Perennial. Fructification in the summer.

The fructification is not very readily seen, being so imbedded among the club-shaped filaments that only the points of the ovate vesicles appear on the surface, which is likewise obscured at this season by a coating of very fine, yellowish, radiating filaments, which render the whole plant slimy to the touch.

CODIUM Bursa. *Pouch-like Codium.* Tab. **2418.**

Frond spherical, hollow.

Fucus Bursa, *Turner Hist. Fuc. tab.* 136. *E. B.* 2183. Codium Bursa, *Agardh Spec. Alg.* 1. 457. *Greville Alg. Brit.* 186. *Hooker Crypt. Part* 1. 318. Spongodium Bursa, *Lamouroux*. Alcyonidium Bursa, *Linn. Syst. Nat.*

One of the most remarkable of marine productions, found on various parts of the coast, but rarely, and chiefly on the extreme southern shores of England and Ireland. Each plant is a globular, hollow, spongy ball, from one to ten inches in diameter, and of a dark green colour, composed internally of a complicated network of pellucid, tubular filaments, from which extend outwardly numerous, closely crowded, radiating, club-shaped ramuli, whose obtuse extremities constitute the outer surface of the ball, giving it a minutely papillary appearance, and rendering it in a recent state velvety to the touch. No fructification has been hitherto observed, but the endochrome of the clavate ramuli presents a similar condensation into the granular form to that observable in *C. tomentosum*, and described in the remarks upon the genus. Perennial.

In the growing state the ball or frond is attached to the rock by one part of its circumference, indicated by the pale spot in our figures.

Genus DCLVII. BRYOPSIS. *Bryopsis.*

Gen. Char. *Frond* membranaceous, filiform, tubular, cylindrical, glistening, branched; branches imbricated or distichous and pinnated; the whole filled with a fine green, minutely granuliferous fluid.

No distinct fructification has been observed on these plants; their uninterrupted tubular structure connects them with *Co-*

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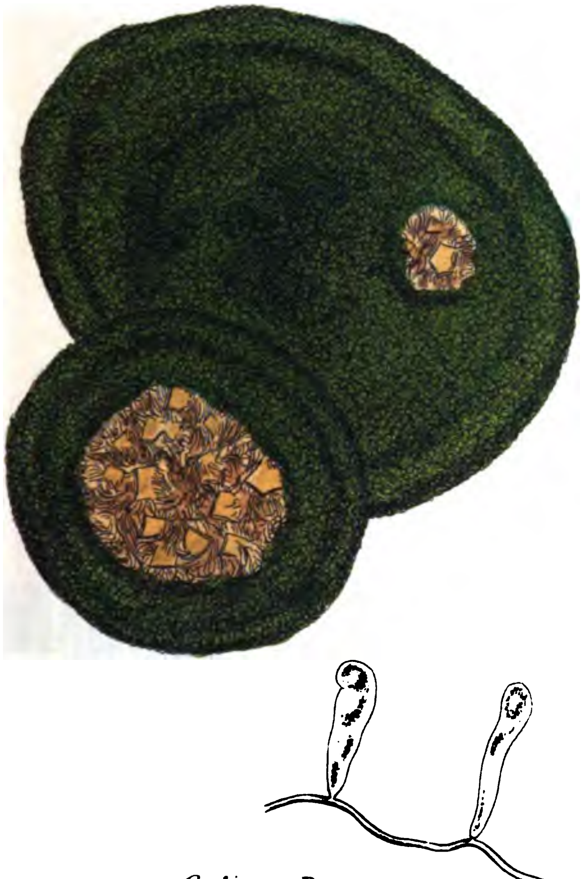

Codium Bursa.

Aug 1 1810 published by Jas Sowerby London.

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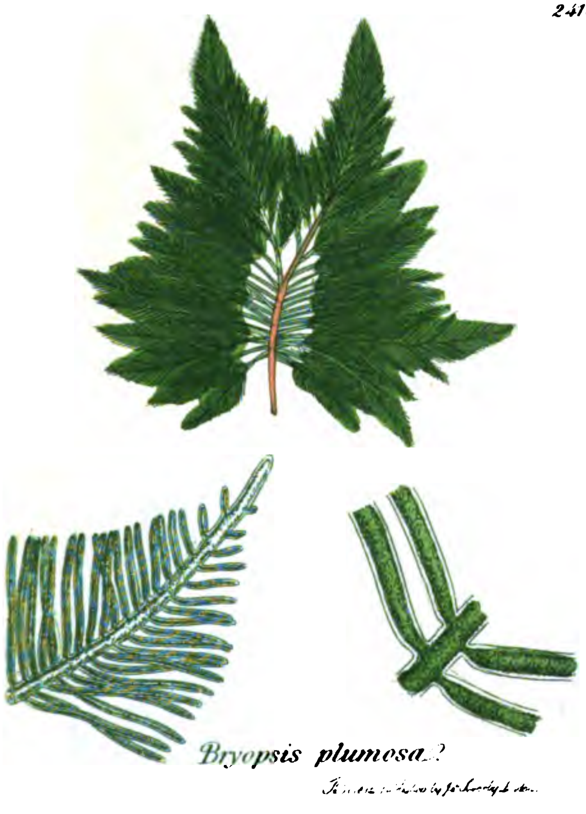
2416



Bryopsis plumosa.?

[illegible] by Jo. Sowerby London.

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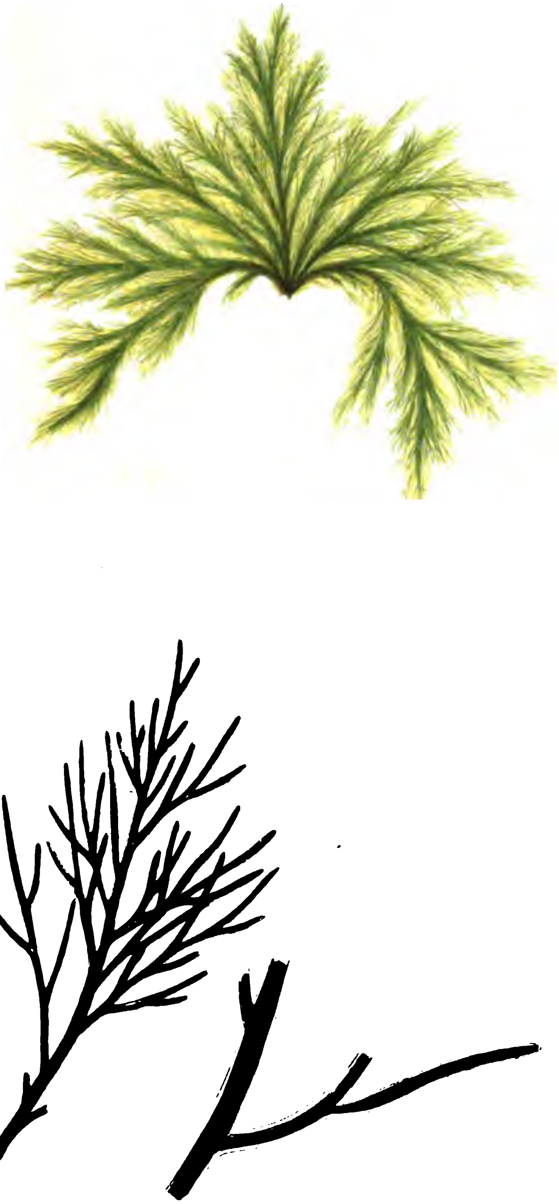

Bryopsis hypnoides.

October 1st 1833.

dium and *Vaucheria*, but the reproductive function is probably different, and, the species being annual, performed by the diffusion of the very conspicuous granular substance of the endochrome. *B. plumosa* is one of the most beautiful and elegant of our native Algæ, its delicate pinnules resembling those of a minute fern or acacia; *B. Rosæ* grows to the length of a foot, and is compared by Bory de St. Vincent to an Italian poplar in miniature; it is a native of the shores of the Falkland Islands. Six or seven species are described. The name, from *βρύον*, *a moss*, and *ὄψις*, *aspect* or *appearance*, is very characteristic of some of the species. All marine.

BRYOPSIS PLUMOSA. *Feathered Bryopsis.* TAB. 2416.

Frond filiform, branched, naked below; the branches scattered, spreading, twice or thrice pinnated; the pinnæ approximated, pectinate.

Ulva plumosa, *Hudson. E. B.* 2375. Bryopsis plumosa, *Agardh Spec. Alg.* 1. 448. *Greville Alg. Brit.* 187. *tab.* 19. *Hooker Crypt. Part* 1. 318. B. Lyngbyei, *Fl. Dan. tab.* 1063. *Lyngbye Hydroph. Dan.* 75. *tab.* 19. *Sprengel.*

Not unfrequent on submarine rocks, stones, and the larger Algæ, on various parts of the coast of Great Britain and Ireland, especially in the little rocky pools left by the ebb-tide, which are in general rich with the treasures of the naturalist, and should never be passed unexamined. Fronds one to three inches high, fixed by a few creeping, interwoven filaments. The main stem, about the thickness of a bristle, throws out an indefinite number of principal branches, naked in the lower part, elegantly pinnated in the upper with numerous, closely-set, linear, pectinate segments, so as to resemble a miniature quill or feather. In the recent state its substance is very tender and somewhat gelatinous, and the colour a bright grass-green; but in drying, the granular matter collects usually in places here and there, leaving the greater portion of the principal stem and branches nearly pellucid. It adheres closely to paper.

It is often much more branched than in our figure. I possess a specimen in which the branches, some of them three inches in length, are twice or thrice divided.

BRYOPSIS HYPNOIDES. *Hypnum-like Bryopsis.* TAB. 2417.

Frond slender, very much branched; the branches long; the ramuli capillary, irregularly inserted, somewhat erect, the lower ones elongated.

Bryopsis hypnoides, *Lamouroux. Greville Alg. Brit.* 188. *Hooker in E. B. Supp.* 2781; *Crypt. Part* 1. 318. B. arbuscula, *Agardh Spec. Alg.* 1. 451.

Found in similar situations to the preceding, with which Dr. Greville seems to consider it too nearly allied to be regarded as a separate species. The suberect, scattered, not pinnated, irregular branches and ramuli constitute the chief distinction; but this gives the plant an aspect so totally different, that until the discovery of intermediate grades it will scarcely rank as a mere variety. It was at first thought rare, having been only met with in two or three places on the coast of Scotland, but the specimen here figured was communicated by Mr. Borrer, from Tor Abbey, Devon, where it was found by Mrs. Griffiths; and it has since been collected on the shores both of Kent and Sussex.

GENUS DCLVIII. VAUCHERIA. *Vaucheria.*

GEN. CHAR. *Fronds* aggregated, tubular, continuous, capillary, coloured by an internal green, pulverulent mass. *Fructification*; dark green, homogeneous vesicles attached to the frond.

This genus, named by DeCandolle in honour of M. T. P. Vaucher, a minister of Geneva, was first established by the latter under the name of *Ectosperma*, in a work entitled 'Histoire des Conferves d'eau douce,' and upwards of twenty species have been described. With much of the habit and general aspect of Confervæ, and equally diversified in their distribution, some being found in the sea, others in fresh water or on damp ground, and either attached to the soil, or epiphytic, or floating, they are far from presenting any structural resemblance to that family, the frond being tubular and uninterrupted throughout, and according in every respect with that of the two preceding genera. The fructification consists of little conical or subspherical vesicles, filled with a dense, dark green, pulverulent mass, which, when mature, vegetates entire, instead of scattering sporules like the thecæ of the Algæ generally. Excepting its external fructification, *Vaucheria* unquestionably comes very near to *Oscillatoria*; and if the observations of Unger be correct, occupies an equally equivocal position in the vegetable kingdom. These observations apply only to one species, *V. clavata*, which is not a native of the British Islands; but they are too remarkable to be altogether passed over even in our cursory view of the genus: they appeared in a memoir, a translation of which was published with some explanatory figures in the fourth number of the 'Magazine of Natural History,' and were in substance as follows:—

M. Franz Unger found the plant growing near Vienna, in a ditch of clear water derived from the melting of snow, and watched the development of the fructification by means of the microscope. According to his account, the reproductive vesicles, which in *V. clavata* terminate the filaments, are excluded by the bursting of the apices of the latter, and are not

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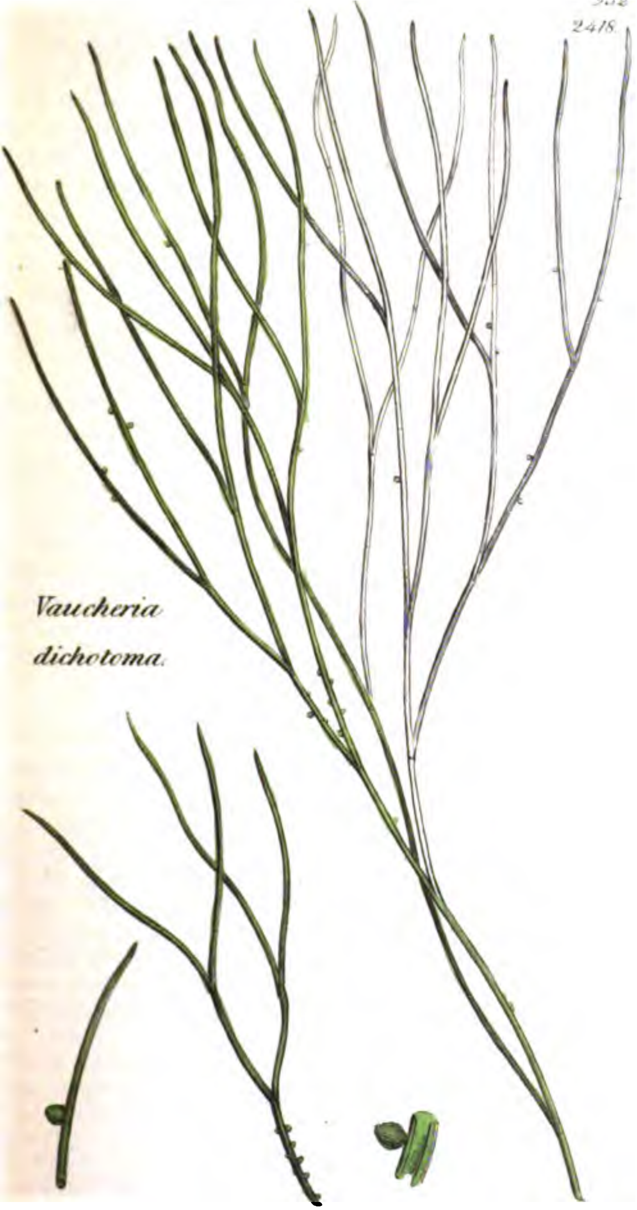
2418.



Vaucheria dichotoma.

Oct. 1. 1801 Publiſhed by Jaſ Sowerby. London.

à priori organs of external development. Having minutely observed their growth and the manner of their separation from the parent plant, he was astonished at finding that instead of floating quietly in the water, as might be naturally expected of a vegetable seed or sporule, each of them swam about for the space of an hour like an animal endowed with volition, nimbly avoiding others as they approached, or gliding round them, stopping, and again setting itself in motion. Towards the close of their hour of animated existence, the globular form of the vesicle became elongated; an appendage resembling a root was eventually extended, by which the young plant fixed itself to the side of the glass vase in which the process of examination was conducted, or to any other body in contact with it; and in about eleven days bore fructification in its turn, when the cycle of events was repeated as before.

Difficult, however, as it may at first appear to reconcile these curious facts with the quietude of vegetable existence, the student of Cryptogamic botany will scarcely deem them sufficient evidence of approach to animality in the species referred to, so liable are mere mechanical movements, in such minute and hitherto little observed bodies, to be confounded with those of vitality. It is still a subject that, added to the anomalous structure of the *Siphoneæ* collectively, deserves further investigation; and their future rank in the scale of organized being is doubtful.

* *Vesicles* (*Coniocystæ*) *solitary.*

VAUCHERIA DICHOTOMA. *Large dichotomous Vaucheria.* TAB. **2418.**

Filaments dichotomous, fastigiate. Vesicles solitary, globose, sessile.

Conferva dichotoma, *Linn. E. B.* 932. *Dillwyn Brit. Conf. tab.* 15.

Vaucheria dichotoma, *Agardh Spec. Alg.* 1. 460. *Greville Alg. Brit.* 190. *Hooker Crypt. Part* 1. 319. *Sprengel. Lyngbye Hydroph. Dan.* 75. *tab.* 19.

The largest of the genus, growing to the length of one or two feet. Common in pools and ditches, especially in the vicinity of the sea, but attaining its largest size in fresh water, which it often fills with its erect, repeatedly dichotomous, entangled filaments; these are generally of a palish grass-green colour, but often darker and approaching to black, of equal diameter throughout, about the thickness of a hog's bristle, and consisting of a thin membranaceous tube including a green granulated pulp. The vesicles of reproduction are solitary, sessile on the sides of the branches, ovato-globose, dark green, and sufficiently large to be visible to the naked eye.

Annual. Found throughout the spring and summer. In the latter part of the year it separates from the bottom and floats upon the surface of the water. It does not adhere to paper in drying.

β. submarina. Filaments more slender, shorter. Vesicles ovate or elliptical.—*Lyngbye Hydroph. Dan.* 76. *tab.* 20.

Found in the sea, at Weymouth, by the Rev. M. J. Berkeley.

I have never met with the transverse septa, mentioned by Sir J. E. Smith, in the previous edition, as giving the stem and branches an irregularly jointed appearance.

The following species, not figured in the 'English Botany,' are described in the 'Algæ Britannicæ' and in the 'Cryptogamia' of Sir W. J. Hooker as belonging to this section :—

Vaucheria Dillwynii. Filaments flexuose, branched, forming a thin terrestrial stratum. Vesicles lateral, sessile, globose. Vaucheria Dillwynii, *Agardh Spec. Alg.* 1. 464. *Lyngbye Hydroph. Dan.* 77. *tab.* 21. *Greville Alg. Brit.* 191. *tab.* 19. *Hooker Crypt. Part* 1. 320. Ceramium Dillwynii, *Roth.* Conferva frigida, *Dillwyn Brit. Conf. tab.* 16.

Common on the ground in damp situations, in the spring and autumn.

Vaucheria terrestris. Filaments straight, forming a lax, somewhat bristly, terrestrial stratum. Vesicles lateral, hemispherical, on the side of a horn-shaped peduncle or receptacle. Vaucheria terrestris, *DeCandolle. Agardh Spec. Alg.* 1. 465. *Greville Alg. Brit.* 191. *Hooker Crypt. Part* 1. 320. Ectosperma terrestris, *Vaucher Conf.* 27. *tab.* 2. *fig.* 3.

Found on the ground in moist shady places, in the spring.

Vaucheria velutina. Filaments creeping; branches erect, fastigiate, woven into a velvety stratum. Vesicles solitary, lateral.—*Agardh Syst. Alg. Add.* 312. *Carmichael in Hooker Crypt. Part* 1. 319.

Found by Captain Carmichael, on the muddy sea-shore, Appin, and at Miltown Malbay, Ireland, by Mr. Harvey, in the spring and summer.

Vaucheria marina. Filaments loosely tufted or distinct; branches few, very long, obtuse. Vesicles solitary, lateral, obovate, pedicellate. Vaucheria marina, *Lyngbye Hydroph. Dan.* 79. *tab.* 22. *Agardh Spec. Alg.* 1. 463. *Carmichael in Hooker Crypt. Part* 1. 319.

Found in the summer, growing on *Furcellaria fastigiata*, by Capt. Carmichael, Appin, Argyleshire.

** *Vesicles* (*Coniocystæ*) *two or more together.*

VAUCHERIA SESSILIS. *Sessile-fruited Vaucheria.* TAB. 2419.

Filaments entangled in floating masses. Vesicles oval, sessile in pairs, with an intermediate little horn-like process.

Vaucheria sessilis, *DeCandolle. E. B.* 1765. *Greville Alg. Brit.* 192. *Hooker Crypt. Part* 1. 320. *Agardh Spec. Alg.* 1. 466. *Lyngbye Hydroph. Dan. tab.* 22. *Sprengel.* Ectosperma sessilis, *Vaucher Conf. tab.* 2. *fig.* 7.

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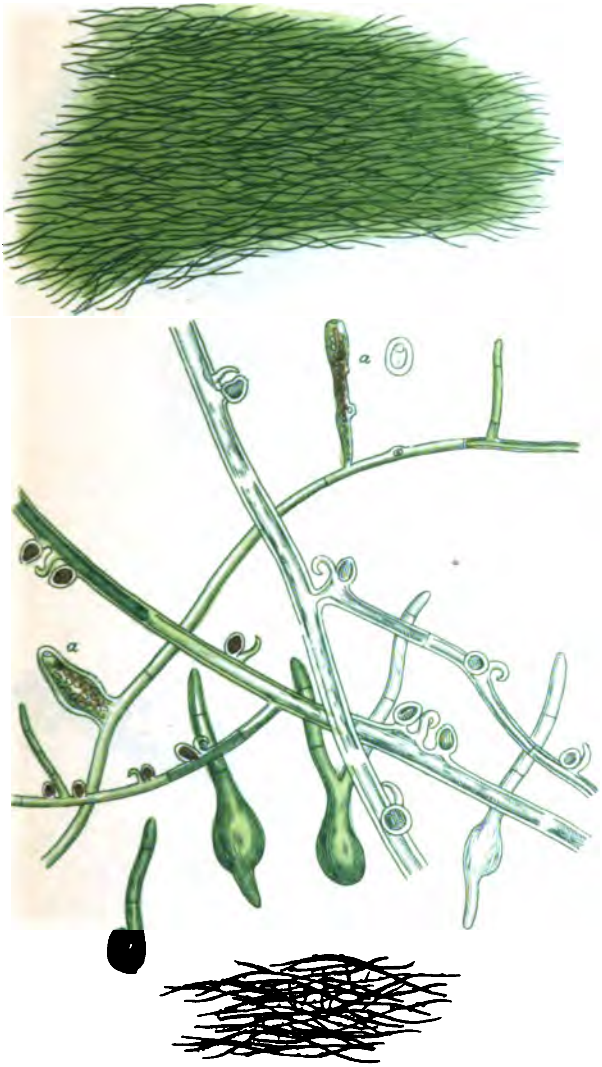

Vaucheria sessilis.

July 1. 1807 published by Jas. Sowerby London

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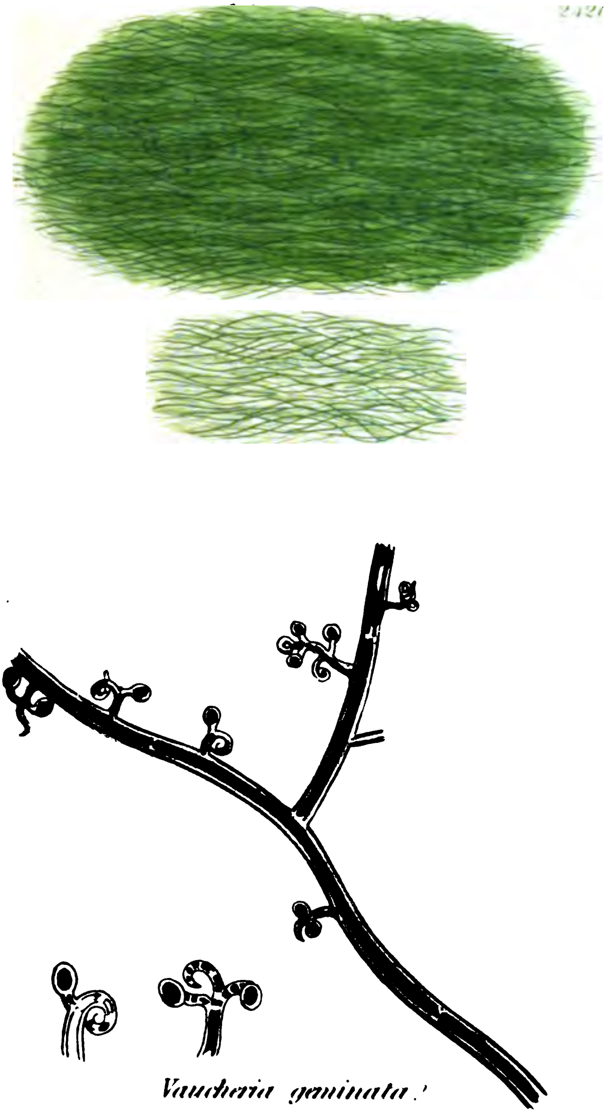

Vaucheria geminata.

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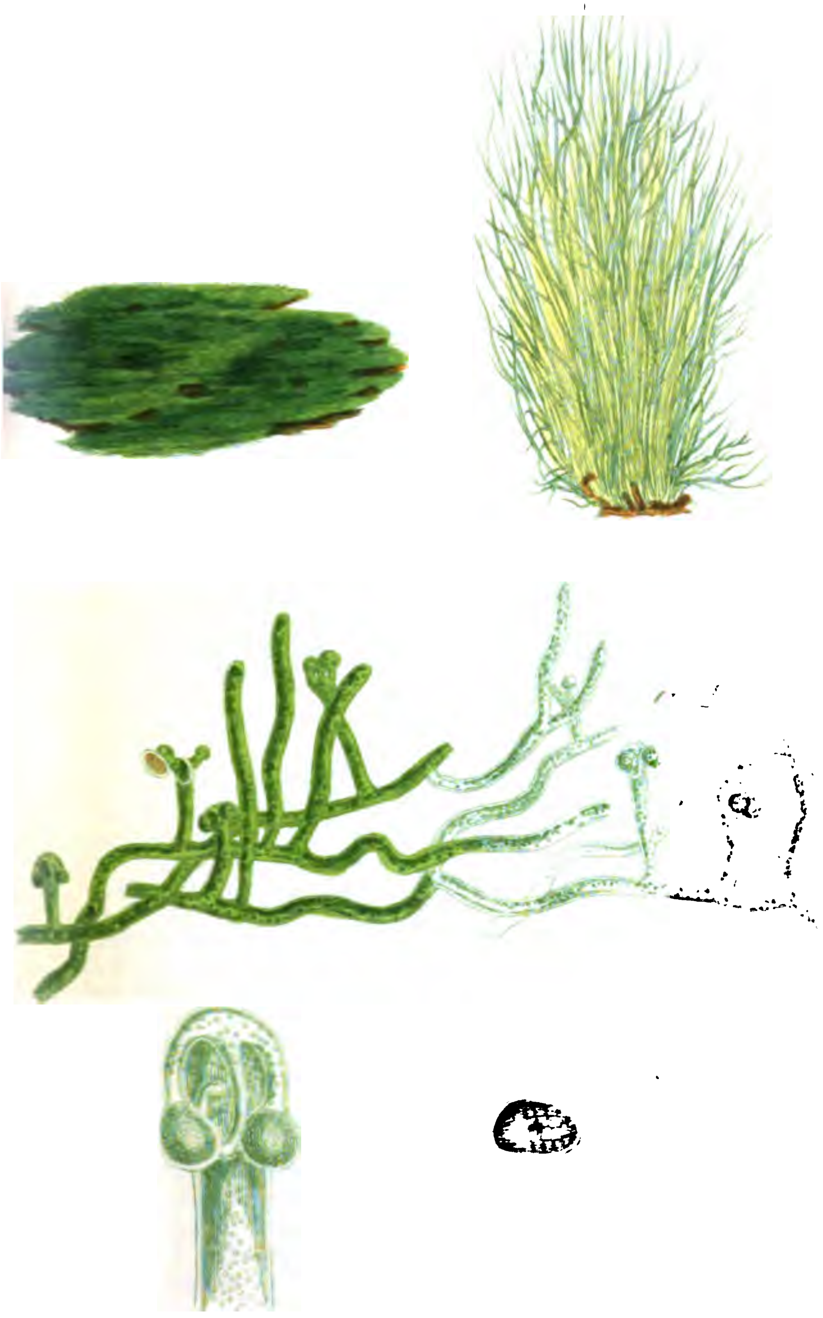

Vauchéria cæspitosa.

July 1st 1830.

Found covering the surface of pools and ditches in broad green patches. Filaments branched, smooth, elastic, often apparently jointed, owing to the separation in places of the granular endochrome. Vesicles sessile, mostly in pairs, ovate, with a more or less curved, awl-shaped process between them. Annual. Appearing in February and lasting through the summer, during which it becomes *V. geminata.*

Not uncommon in the south of England.

Young specimens in different stages of development from the vesicle are represented at the lower part of the magnified figure.

" Vesicles, of the nature of galls perhaps, inhabited by Müller's *Cyclops Lupula*, are often found on the branches, see *a, a*, with a dark-coloured animal besides."—*Sir J. E. Smith.*

VAUCHERIA ORNITHOCEPHALA. *Bird's-head Vaucheria.*

Filaments loosely branched and entangled in dense floating masses. Vesicles unilateral, binate or quaternate, oblique, upon short, straight peduncles, with a short beak and pellucid border.

Vaucheria ornithocephala, *Agardh Spec. Alg.* 1. 467. *Greville Alg. Brit.* 193. *Hooker Crypt. Part* 1. 320. Conferva vesicata, *Dillwyn Brit. Conf. tab.* 74.

Not uncommon in the latter part of the summer and autumn, in pools and ditches, forming dense, floating masses; a habit so general in the species of this section, that they are scarcely distinguishable but by the different disposition of their reproductive vesicles.

Perhaps only a variety of the preceding or following.

VAUCHERIA GEMINATA. *Twin-fruited Vaucheria.* TAB. **2420.**

Filaments dichotomous, very slender, forming dense floating masses. Vesicles ovate, opposite, laterally pedunculate on a horn-shaped process or receptacle.

Vaucheria geminata, *DeCandolle. E. B.* 1766. *Agardh Spec. Alg.* 1. 467. *Greville Alg. Brit.* 193. *tab.* 19. *Hooker Crypt. Part* 1.320. *Lyngbye Hydroph. Dan. tab.* 23. *Sprengel.* Ectosperma geminata, *Vaucher Conf.* 29. *tab.* 2. *fig.* 5.

Found in pools and ditches during the summer, floating in entangled, tenacious tufts. Vesicles generally in pairs, on short, opposite stalks springing from lateral, horn-shaped processes more or less curved at the extremity; occasionally they are solitary, and more rarely, two pairs are sometimes developed on the same process, one above the other.

Certainly not specifically distinct from *V. sessilis*, which is the spring, as this is the summer state of the same plant.

VAUCHERIA CÆSPITOSA. *Tufted Vaucheria.* TAB. **2421.**

Filaments subdichotomous, forming dense tufts or strata. Vesicles in opposite pairs, subglobose, the horn-like summit of the supporting branch projecting between them.

Vaucheria cæspitosa, *Agardh Spec. Alg.* 1. 468. *Berkeley in E. B. Supp.* 2841. *Greville Alg. Brit.* 194. *Hooker Crypt. Part* 1.321.

Lyngbye Hydroph. Dan. tab. 23. *Sprengel.* Ectosperma cæspitosa, *Vaucher Conf.* 28. *tab.* 2. *fig.* 4. Conferva amphibia, *Dillwyn Brit. Conf. tab.* 41.

Very common in springs, clear pools and rivulets, near the banks and on the wood-work of mill-dams; also on the soil of damp gardens. When growing in water it forms dense spongy tufts, with a rich, velvety-green surface; a thin stratum when spreading over soil. Filaments dichotomous, or furnished with secund branches, which divide above into two very short, stipitiform branchlets, each bearing a single, depressed, subglobose vesicle, with an intermediate, straight or curved, colourless, horn-like process. In age the vesicles and their contents become colourless, with the exception of a brownish spot in the centre. Found at all seasons, but principally in fructification in the spring.

Our Plate represents the terrestrial variety, both in its natural state and after having been kept for a few days in water, when it seems to have assumed somewhat the appearance of the aquatic one. The lowermost figures are magnified views of the tip of one of the branches, with its vesicles and horn-like process, and an old vesicle separate.

Mr. Berkeley, whose description is given nearly verbatim, remarks that, growing on the ground, it has much the habit of *V. Dillwynii*, of which Agardh suspected it might be a variety. I am only acquainted with its aquatic form, in which, setting aside a very slight difference of the mode of branching, its claim to specific distinction from *V. geminata* seems to be exceedingly doubtful.

VAUCHERIA RACEMOSA. *Racemose Vaucheria.*

Filaments capillary, forming dense, entangled, floating masses. Vesicles in pedunculate, racemose clusters.

Vaucheria racemosa, *DeCandolle. Lyngbye Hydroph. Dan.* 82. *tab.* 23. *Agardh Spec. Alg.* 1. 469. *Sprengel. Greville Alg. Brit.* 195. Ectosperma racemosa, *Vaucher Conf. tab.* 3. *fig.* 8.

Found in ponds and ditches in the neighbourhood of Edinburgh, in the summer. "Filaments very slender, several inches in length, floating in large entangled masses, flexuose, subdichotomously branched. Vesicles ovate, dark green, five in number or more, sessile or subsessile in a clustered manner upon a common peduncle or receptacle, given off at a right angle from the branches."—*Greville.*

Dr. Greville seems to be the only British botanist who has noticed this as a native, first in the 'Edinburgh Flora' and afterwards in the 'Algæ Britannicæ': in its mode of growth he remarks it most resembles *V. geminata*, but is easily distinguished by the fructification. The species, however, under which the latter ranks is, as before noted, so polymorphous in the development of its vesicles, that even the present may be only one of its many varieties.

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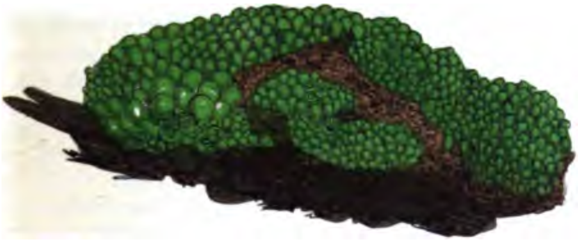
2422.



Botrydium granulosum?

May 1 1798 Published by J. Sowerby London

GENUS DCLIX. BOTRYDIUM. *Botrydium.*

GEN. CHAR. *Plant*, a spherical, vesicular receptacle, filled with a watery fluid, dehiscent at the apex, terminating below in a radicating tuft of fibres.

A single species is comprised under this genus, the multitude of whose synonyms evinces the difficulty experienced by botanists in referring it to any other previously established. Its uninterrupted tubular or vesicular structure justifies its arrangement with the *Siphoneæ*, although no distinct fructification has been found. The name, bestowed by Wallroth, from βότρυς, *a bunch of grapes*, accords with the appearance presented by a cluster of individuals under a magnifier.

BOTRYDIUM GRANULOSUM. *Grain-like Botrydium.* TAB. 2422.

Tremella granulata, *Hudson. E. B.* 324. Botrydium granulatum, *Greville Alg. Brit.* 196. *tab.* 19. *Hooker Crypt. Part* 1. 321. B. argillaceum, *Wallr. Ann. Bot.* 153. Vaucheria granulata, *Lyngbye.* V. radicata, *Agardh Spec. Alg.* 1. 465. Coccochloris radicata, *Sprengel.* Hydrogastrum granulatum, *Desv. Fl. Ang.* 19. Ulva granulata, *Linn. Lightfoot Fl. Scot.*

Probably not unfrequent on damp, clayey ground, and on the bottoms of dried-up ponds and ditches, which it covers with innumerable green globules, about the size of mustard-seed, not at all connected with each other, sessile at first, but soon elevated on a thick footstalk, attached to the ground by root-like fibres. When walked upon they crackle under the feet like thin ice, and discharge a watery fluid, which also comes out spontaneously, as the plant advances in age, by an orifice at the top, and immediately afterwards the membrane collapses, forming a little cup with a hole in the centre. The apparent root-fibres are tubular, and branches of the general cavity. No fructification has been observed in this simplest form of the *Siphoneæ*; but it is presumed that it multiplies by the effusion of the watery fluid, which contains numerous microscopic molecules, that give a green colour to the entire plant.

TRIBE XIII. LEMANIEÆ.

Aquatic plants, existing in fresh and rapidly running water. Fronds slender, tubular, either whorled with papillæ or moniliform, formed of a coriaceous cellular membrane; the cells regular, interspersed with cellular ducts. From scattered points obscurely conspicuous, even externally, upon this membrane, and on its interior surface, there arise fascicles of minute, simple or dichotomous, moniliform, articulated filaments; the articulations elliptical, being themselves the sporules, eventually separating and germinating.

The single genus comprised in this tribe has no resemblance to the *Siphoneæ*, except the uninterrupted tubular structure of the frond, the cavity of which is empty, or at least destitute of the granuliferous fluid or pulverulent endochrome that characterizes the individuals of that remarkable family. The texture is cellular, and traversed by longitudinal duct-like cavities, and thus equally opposed to the homogeneous, uniform membrane of the latter, and to the regular articulations of the Confervoid series, to which these plants were originally referred.

GENUS DCLX. LEMANIA. *Lemania.*

GEN. CHAR. *Frond* filiform, branched, torulose or inflated at intervals, coriaceous, cellular. *Fructification*; sporules connected into necklace-like, simple or branched filaments, forming pencil-shaped tufts, arising from the inner surface of the cavity of the frond.

The inflations of the tube are sometimes so closely and regularly disposed, especially in the slender branches, as to give the plant, at first sight, the appearance of being articulated like a *Conferva*.

Five species have been described, but probably not more than two or three are really distinct.

Named by Bory de St. Vincent in honour of M. Leman, a French botanist, and especially attached to the study of algology.

LEMANIA FLUVIATILIS. *River Lemania.* TAB. 2423.

Frond olive-green, subcoriaceous, repeatedly and alternately branched; branches attenuated, inflated at intervals more or less regularly, the interstices cylindrical.

Conferva fluviatilis, *Linn.* *E. B.* 1763. *Dillwyn Conf. tab.* 29. Lemania fluviatilis, *Agardh Spec. Alg.* 2. 4. *Hooker Crypt. Part* 1. 322. Nodularia fluviatilis, *Lyngbye Hydroph. Dan.* 99. *tab.* 29. Polysperma fluviatilis, *Vaucher.* Chantransia fluviatilis, *DeCandolle.*

Found in clear and always rapid streams and rivulets, hence chiefly in mountainous or subalpine districts. Fronds several from the same small callous disc, attached to rocks or pebbles, dull olive-green, six inches to a foot in length, more or less branched, solid for a small distance from the base, otherwise tubular throughout; set here and there externally, especially at the inflations, with tufts of minute,

1763

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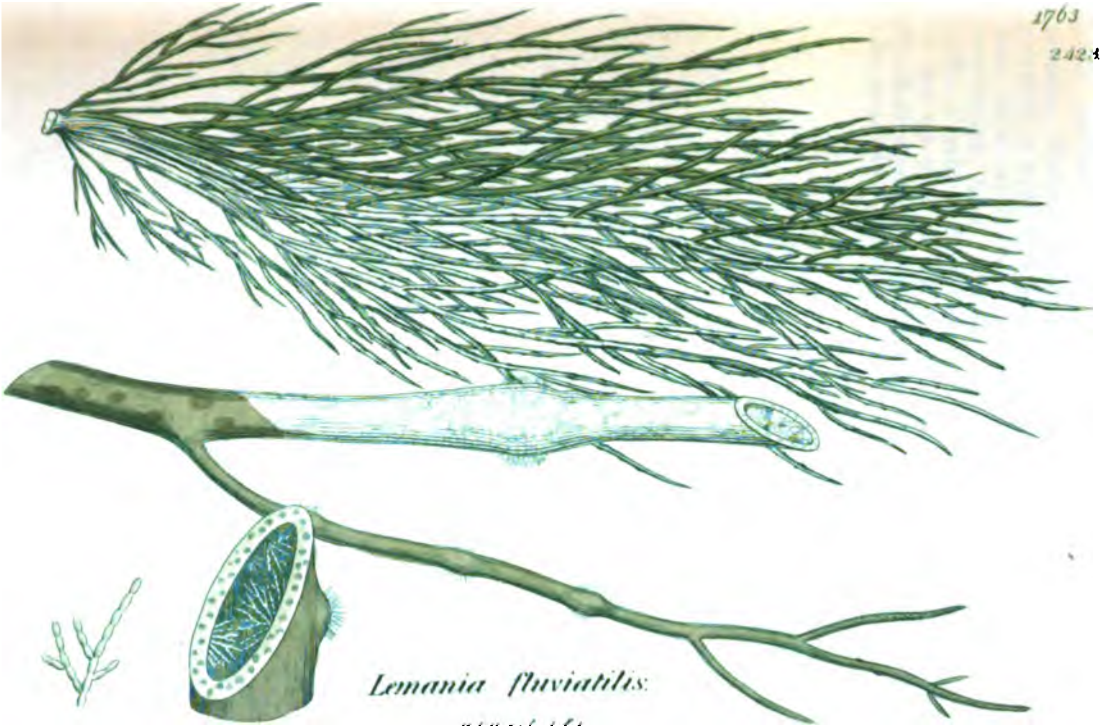

Lemania fluviatilis.

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branched, moniliform filaments: similar, but somewhat more divaricated tufts occupy the interior, as shown in our magnified section, and are supposed to be the reproductive media of the species, the office of sporules being effected by the separation of their bead-like vesicles. Annual.

β. torulosa. Branches nearly simple; the inflations so close as to give them a moniliform appearance. L. torulosa, *Agardh Act. Holm.* 1814, *tab.* 2. *fig.* 1. *Hooker Crypt. Part* 1. 322. Conferva torulosa, *Roth. Dillwyn Conf. Synopsis* 77. *tab. F.* C. fluviatilis, β. torulosa, *Roth. Cat. E. B.* 1763.

"I fear the more or less beaded appearance of the fronds will hardly afford a permanently distinguishing character between this and the preceding."—*Hooker.*

SUBORDER II. CONFERVOIDEÆ.

Plants all filamentous, simple or branched, really or apparently articulated; filaments not invested by definite gelatine.

The more complex genera of this group present, in their stems and main branches, an aggregation of vesicles more or less according with that observed in *Rhodomela* and some others of the tribe *Florideæ*; the more simple, as the true *Confervæ*, consist throughout of a single series of vesicles, more or less elongated and connected by the extremities, so as to appear jointed, especially under a magnifier, the branches always arising from the articulations. Every part of the plant is invested by a dense, perfectly transparent, film-like coating, so closely adhering to the vesicles as to seem continuous with their substance, and generally giving a uniform and even surface to the filaments. The reproductive germs seem in most instances to be the separate granules of the endochrome, dispersed by the bursting of the vesicle which contains them; this vesicle in the higher grades being developed apart from the rest, either terminal or axillary, and assuming the character of a theca, while in the lower, those forming the substance of the plant are indiscriminately sporuliferous: in some genera two forms of fructification occur.

The tribes *Tyndarideæ* and *Oscillatorieæ* are very different from the rest in their structure and economy, and ought perhaps to constitute a distinct group: indeed their vegetable nature is doubted by many naturalists.

Few, comparatively speaking, of the *Confervoideæ* occur in warm climates, but in the cooler parts of the temperate zones they abound, and seem to increase as we approach the higher latitudes both of the northern and southern hemispheres. Of the probable number of species it is very difficult to form an estimate.

Tribe XIV. ECTOCARPEÆ.

Plants olivaceous or virescent; marine. Fructification monœcious: external thecæ, and granules in swollen ramuli.

Genus DCLXI. CLADOSTEPHUS. *Cladostephus.*

Gen. Char. *Frond* cartilaginous, inarticulate; whorled with short articulated ramuli; olivaceous. *Fructification* of two kinds on the same individual: ovate thecæ, furnished with a terminal pore, and granules imbedded in the apices of the ramuli.

Seven species have been described. Named by Agardh, from κλάδος, *a branch*, and στέφος, *a crown*, in allusion to the whorled ramuli, which constitute the most important distinctive character of the genus.

CLADOSTEPHUS verticillatus. *Whorled Milfoil Cladostephus.* Tab. 2424.

Ramuli regularly whorled, subdistant, mostly forked.

Conferva verticillata, *Dillwyn Conf. tab.* 55. *E. B.* 1718. Cladostephus verticillatus, *Lyngbye Hydroph. Dan.* 102. *tab.* 30. *Hooker Crypt. Part* 1. 322. C. Myriophyllum, *Agardh Spec. Alg.* 2. 10.

Frequent on all parts of our coast, growing either on rocks, attached to corallines, or about the bases of the larger *Fucoideæ* and *Laminarieæ*. Stems three to six inches high, rounded, wiry, black, irregularly branched, branches patent. The whole plant is closely set with dense whorls of short, rigid, incurved, simple or forked, articulated ramuli, more or less imbricated over each other. A branch of this species bearing thecæ, which seem to be of rare occurrence, was communicated to Mr. Sowerby by Miss Biddulph, from Southampton, and is figured, with one of its fertile ramuli, at fig. 2. on the next Plate.

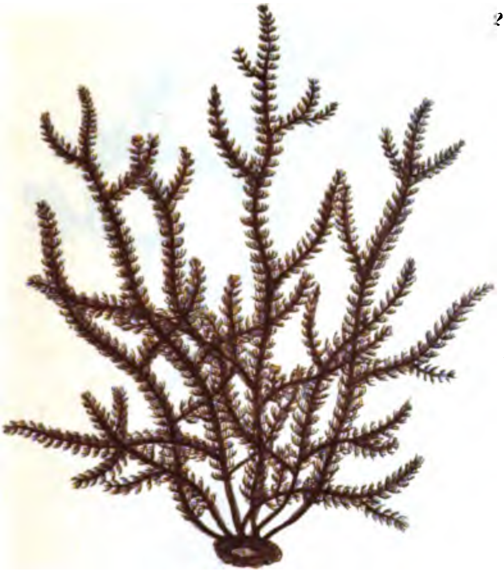
CLADOSTEPHUS spongiosus. *Sponge-like Cladostephus.* Tab. 2425.

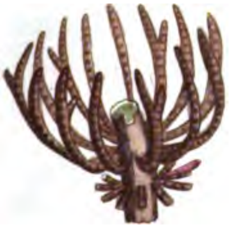
Ramuli irregularly whorled, imbricated, mostly simple.

Conferva spongiosa, *Dillwyn Conf. tab.* 42. *E. B.* 2427. Cladostephus spongiosus, *Agardh Spec. Alg,* 2. 12. *Hooker Crypt. Part* 1. 322. Fucus hirsutus, *Linn. Mant.*

1718

2424.



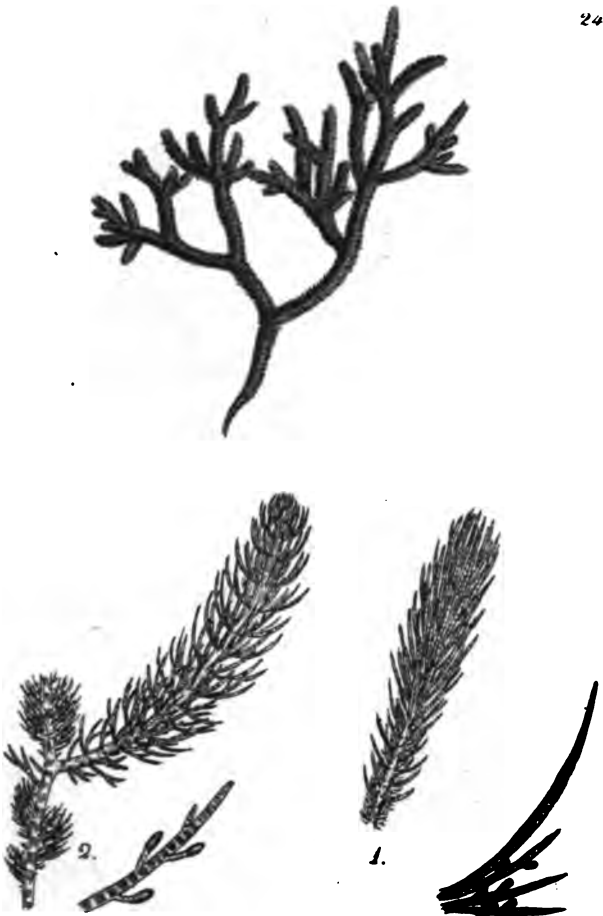


Cladostephus verticcillatus.

Mar. 1. 1807 Publish'd by Ja.s Sowerby London.

2427

2425.

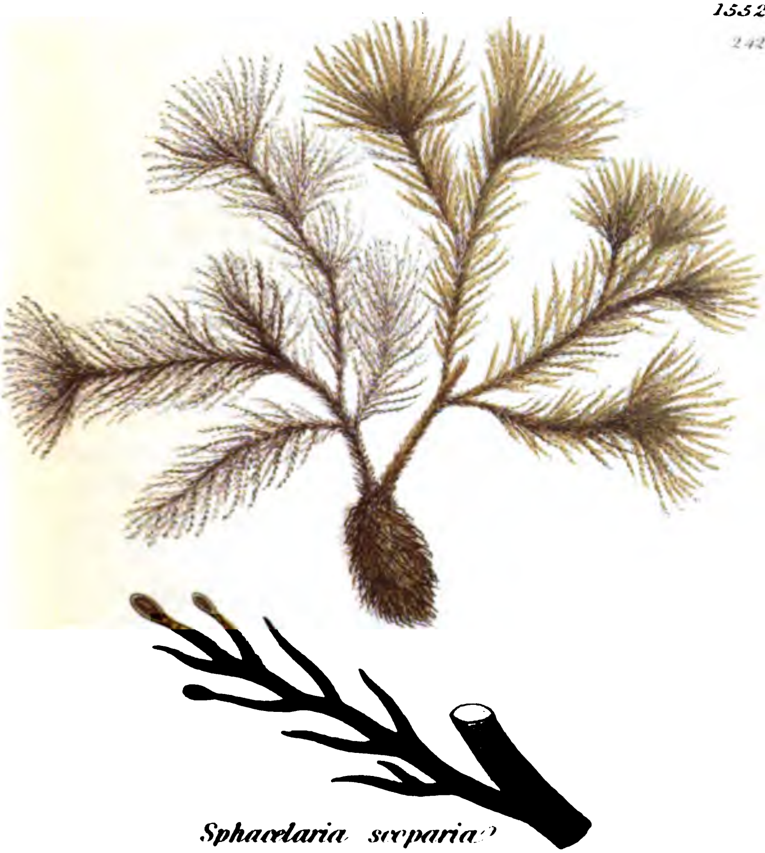


Cladostephus spongiosus.

[illegible]

1552

2420.



Sphacelaria scoparia?

Jan. 1. 1806 Published by Jas. Sowerby, London.

Frequent as the preceding, and similar in habit. The smaller size, and scattered rather than whorled ramuli, which are mostly simple, and so densely imbricated as to give the plant a spongy appearance, are the chief distinctions, but are sufficiently marked to render the confusion of the two species impossible; the present too is a far less elegant plant than *C. verticillatus.* The magnified figure (2) belongs to the latter species. The fructification is similar in both.

GENUS DCLXII. SPHACELARIA. *Sphacelaria.*

GEN. CHAR. *Frond* rigid, jointed as well as the branches; branches distichous, rarely dichotomous. *Fructification* of two kinds on the same individual: ovato-spherical thecæ, furnished with a terminal pore; and a granular mass, inclosed in the hyaline vesicated apices of the branches.

The generic name, bestowed by Lyngbye, from σφάκελος, *gangrene*, alludes to the dark, swollen extremities of the fertile ramuli. Fourteen or fifteen known species are referred to it.

* *Frond stuppose (beset with woolly fibres) at the lower part.*

SPHACELARIA SCOPARIA. *Broom-like Sphacelaria.* TAB. **2426.**

Frond stuppose and shaggy at the base; upper branches broadly fasciculate, rigid, pinnate; pinnæ simple, short, spine-like, alternate, erect.

Conferva scoparia, *Linn. Dillwyn Conf. tab.* 52. *E. B.* 1552. Sphacelaria scoparia, *Lyngbye Hydroph. Dan.* 104. *tab.* 31. *Agardh Spec. Alg.* 2. 19. *Hooker Crypt. Part* 1. 323.

Frequent on many parts of the coast, growing on the rocks, or upon pebbles and shells, with which it is thrown up on the beach at all seasons. Fronds from three to six inches high, springing from a comparatively large, hairy base, and clothed about the lower part with small entangled, jointed fibres; much-branched and subdivided above. Ultimate ramuli slender, awl-shaped, alternate, subpectinate, tufted at the extremities of the branches. Articulations twice as broad as they are long. Perennial. Dull olive-brown.

SPHACELARIA DISTICHA. *Shaggy pinnated Sphacelaria.*

Frond stuppose at the base, much-branched; secondary branches pinnate; pinnæ erecto-patent, subulate, alternate, the lower ones slightly divided.

Sphacelaria disticha, *Lyngbye Hydroph. Dan.* 104. *tab.* 31. *Agardh Spec. Alg.* 2. 26. *Hooker Crypt. Part* 1. 323.

Found occasionally on the southern coast of England, and by Dr. Greville in the Firth of Forth. Greenish-olive.

SPHACELARIA filicina. *Fern-like Sphacelaria.*

"Stuppose at the base. Branches lanceolate decomposite pinnate; pinnæ alternate; pinnules fasciculato-multifid."

Sphacelaria filicina, *Agardh Spec. Alg.* 2. 22. *Hooker Crypt. Part* 1. 323. S. hypnoides, *Greville Crypt. Fl. tab.* 348.

Rare; on the southern coast of England.

** *Base of the frond naked* (*not stuppose*).

SPHACELARIA plumosa. *Feathery Sphacelaria.* Tab. **2427.**

Frond without stuppa, elongated, branched, inarticulate, pinnate; pinnæ very close, simple, pectinated, erecto-patent.

Conferva pennata, *E. B.* 2330, *left-hand fig.* Sphacelaria plumosa, *Lyngbye Hydroph. Dan.* 103. *tab.* 30. *Agardh Spec. Alg.* 2. 24. *Hooker Crypt. Part* 1. 324. Ceramium pennatum, *Fl. Dan. tab.* 1481.

Found, but rarely, in the same habitats with *S. disticha*, with which, as well as with the following, it has often been confounded. Fronds one to four inches high, tufted, bristle-like, naked at the base, irregularly branched; pinnated with simple, opposite, somewhat pectinate ramuli, giving it a beautiful feathery appearance. Greenish-olive.

SPHACELARIA cirrhosa. *Small pinnate Sphacelaria.* Tab. **2428.**

Fronds without stuppa, densely tufted, articulated throughout; branches alternate, irregularly pinnated.

Conferva pennata, *Dillwyn Conf. tab.* 86. *E. B.* 2330, *right-hand fig.* Sphacelaria cirrhosa, *Agardh Spec. Alg.* 2. 27. *Hooker Crypt. Part* 1. 324. S. pinnata, *Lyngbye Hydroph. Dan.* 105. *tab.* 31.

Common on rocks, and adhering to corallines and the larger Algæ. Well-distinguished from the preceding, with which it was confounded in the first edition of 'English Botany,' by its more densely tufted habit and very irregular ramuli. Olive-brown or greenish.

It is liable to much variation in habit.

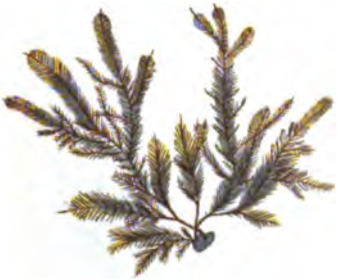
SPHACELARIA radicans. *Creeping Sphacelaria.* Tab. **2429.**

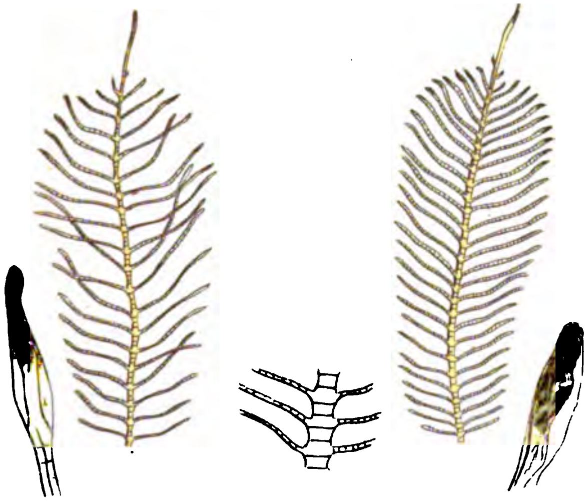
Fronds branched, decumbent, creeping below, somewhat rigid. Articulations nearly twice as broad as long.

Conferva radicans, *Dillwyn Conf. Syn.* 57. *tab. C.* *E. B.* 2138. Sphacelaria radicans, *Hooker Crypt. Part* 1. 324. S. cirrhosa, ζ. simplex, *Agardh Spec. Alg.* 2. 29.

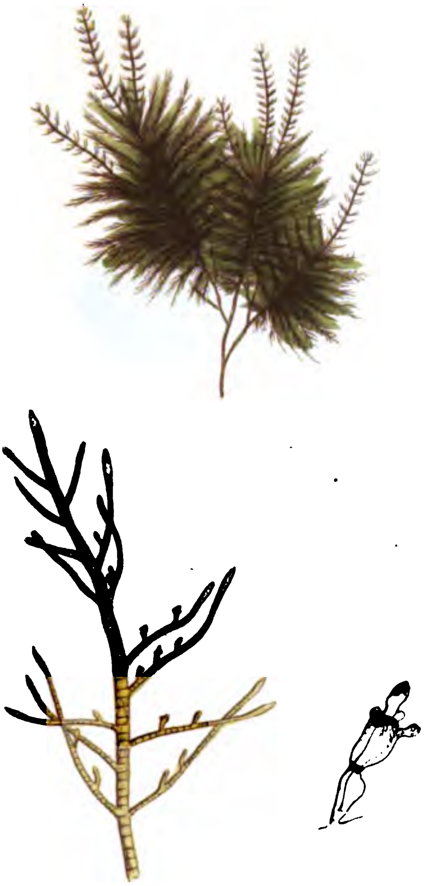
It forms dense, upright tufts, from half an inch to an inch high, on sand-covered rocks on various parts of the coast, is of a dark olive-brown colour, and rather rigid texture. The filaments, though for the most part erect, are decumbent at the base, sending out here and there a few root-like fibres which fix them to the sand. Thecæ minute, lateral, sessile or stalked, globular.

Our figure, taken from a dried specimen, represents the dissepiments pellucid; they are not so in the recent plant. The fructification is also wanting, and though possessing specimens from several



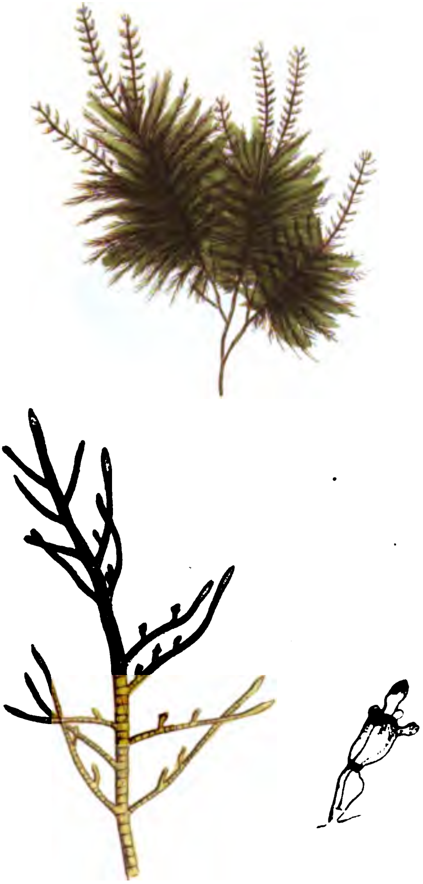


Sphacelaria plumosa.



Sphacelaria cirrhosa.?

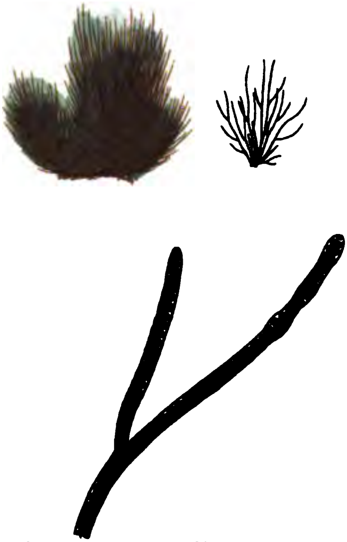
2428.



Sphacelaria cirrhosa.?

2138

2420.

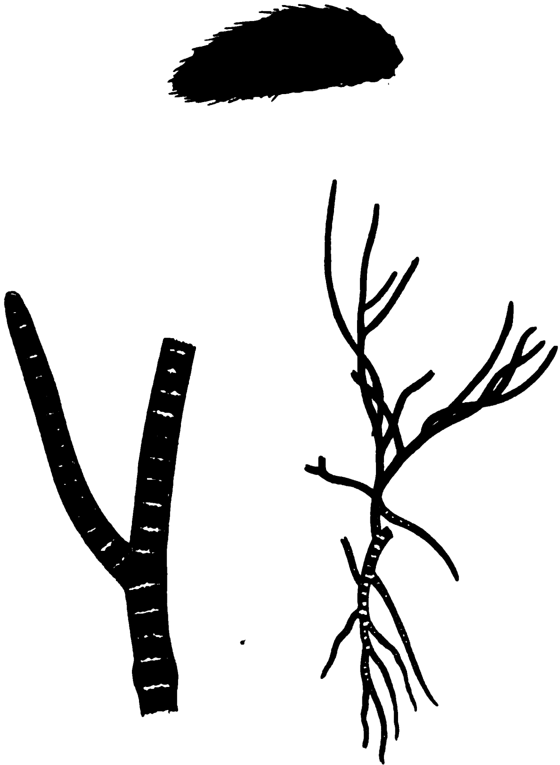


Sphacelaria radicans.

Ap^l 1 1810 published by J^s Sowerby London.

2172

2430.



Sphacelaria olivacea ?

July 1 1810 published by Jas. Sowerby London

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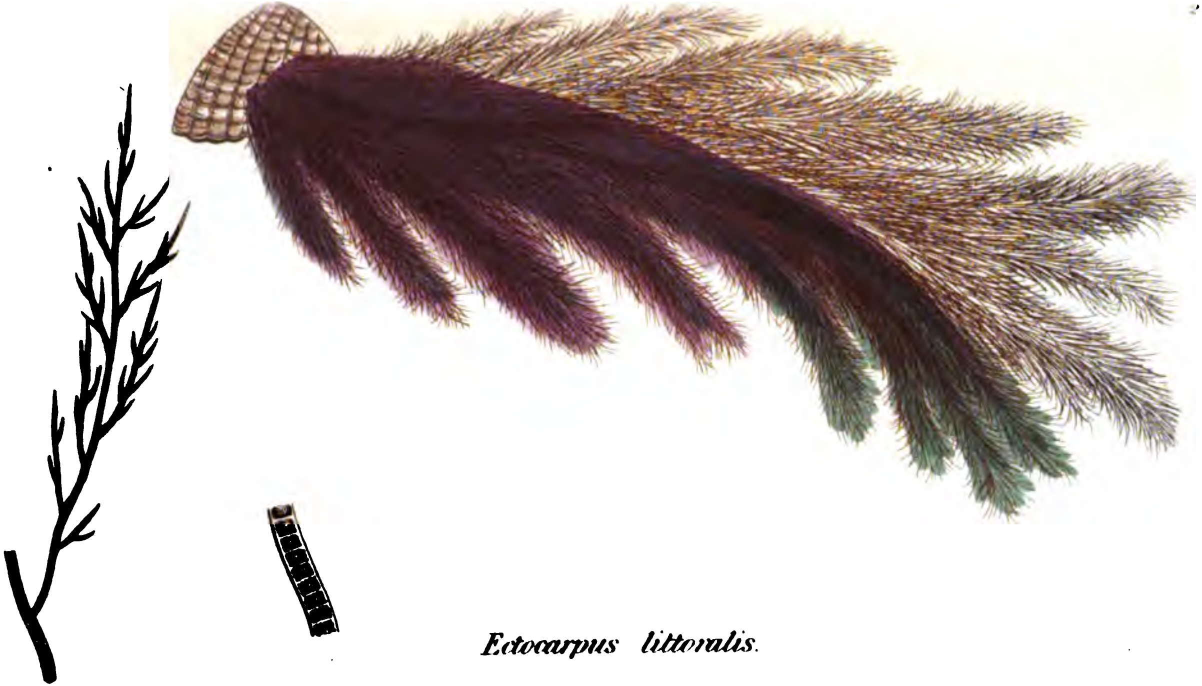


Ectocarpus littoralis.

June 1 [illegible] published by Jaˢ Sowerby London

localities, I am unable to supply the deficiency: the plant, increasing by its decumbent branches, does not appear to be prolific in the development of thecæ.

SPHACELARIA OLIVACEA. *Olive Sphacelaria.* TAB. **2430.**

Fronds short, erect, tufted, branched; branches alternate, simple. Articulations rather broader than long.

Conferva olivacea, *Dillwyn Syn. Conf.* 57. *tab. C.* *E. B.* 2172. Sphacelaria olivacea, *Agardh Spec. Alg.* 2. 30. *Hooker Crypt. Part* 1. 324.

Found on rocks, and attached to larger Algæ, chiefly in the North. The fronds form little tufts scarcely half an inch high; they are very much entangled, irregularly branched, the branches simple and terminating obtusely.

It approaches so nearly to *S. radicans* as to be scarcely distinguishable in the dried state; indeed the creeping habit of the latter seems to constitute the only real difference. They are both probably, as suggested by Agardh, varieties of *S. cirrhosa.*

SPHACELARIA RACEMOSA. *Racemose Sphacelaria.*

Fronds short, tufted, olivaceous, dichotomous. Thecæ ovate, racemose, pedunculate.

Sphacelaria racemosa, *Greville Crypt. Fl. tab.* 96. *Hooker Crypt. Part* 1. 325. *Agardh Spec. Alg.* 2. 34.

Found by Dr. Richardson in the Firth of Forth. This plant I have never seen: it is described as larger than *S. olivacea,* the racemose thecæ forming its most prominent feature.

GENUS DCLXIII. ECTOCARPUS. *Ectocarpus.*

GEN. CHAR. *Fronds* capillary, olivaceous or brown, flaccid, without longitudinal striæ. *Fructification*: spherical or siliquæform thecæ, and granules in swollen ramuli.

This genus, established by Lyngbye, and containing about eight or ten known species, is neither a natural nor a well-defined one; but the flaccid habit of the plants will prevent their being confounded with the *Sphacelariæ.* The thecæ are very much diversified in form, and in most of the species of rare occurrence: the name, from ἐκτὸς, *external,* and καρπὸς, *fruit,* indicative of their position, is not the most characteristic that might have been bestowed.

* *Secondary branches alternate, fascicled or secund.*

ECTOCARPUS LITTORALIS. *Common Ectocarpus.* TAB. **2431.**

Fronds densely tufted, very much branched; ultimate ramuli more or less patent, alternate or fascicled. Thecæ spherical, sessile.

Conferva littoralis, *Linn.* *Dillwyn Conf. tab.* 31. *E. B.* 2290. Ectocarpus littoralis, *Lyngbye Hydroph. Dan. tab.* 42, 43. *Agardh Spec. Alg.* 2. 40. *Hooker Crypt. Part* 1. 325. *Lyngbye. Ritter. Gaillon.*

Very common, growing strongly attached to rocks, stones, shells, and the larger submarine plants, and forming dense soft tufts, six inches or more in length, of a dark olivaceous-green or rusty-brown colour. Filaments very slender, repeatedly branched, and variously twisted and entangled together, generally in rope-like bunches.

ECTOCARPUS SILICULOSUS. *Pod-fruited Ectocarpus.* TAB. **2432.**

Fronds tufted, flaccid, slender; ultimate ramuli erect, subulate, alternate or fascicled. Thecæ lanceolate, siliquæform.

Conferva siliculosa, *Dillwyn Syn.* 112. *tab. E.* *E. B.* 2319. Ectocarpus siliculosus, *Lyngbye Hydroph. Dan.* 131. *tab.* 43. *Agardh Spec. Alg.* 2. 37. *Hooker Crypt. Part* 1. 325.

Nearly as frequent as the last species, and similarly attached. It presents great diversity of appearance in different habitats, and some of its varieties, in the absence of fructification, are liable to be mistaken for *E. littoralis*; but the branches are less twisted, more slender and flaccid, and the colour generally paler. The stalked, lanceolate or pod-shaped fructification constitutes the most remarkable character of distinction: these processes, however, can scarcely be regarded as thecæ, not consisting of single vesicles, but being modifications of the ultimate ramuli with their upper joints more or less swollen.

ECTOCARPUS TOMENTOSUS. *Woolly Ectocarpus.*

"Filaments flexuose, very slender, woven into a dense, sponge-like, branching frond. Siliquæ (fructification) oblong, obtuse."—*Hooker.*

Conferva tomentosa, *Dillwyn Conf. tab.* 26. Ectocarpus tomentosus, *Lyngbye Hydroph. Dan.* 132. *tab.* 44. *Agardh Spec. Alg.* 2. 44. *Greville Crypt. Fl. tab.* 316. *Hooker Crypt. Part* 1. 326.

Occasionally met with on various parts of the coast, attached to stones, corallines, and the larger Algæ. In general aspect it resembles at first sight *Codium tomentosum.*

** *Secondary branches opposite.*

ECTOCARPUS GRANULOSUS. *Granular Ectocarpus.* TAB. 2433.

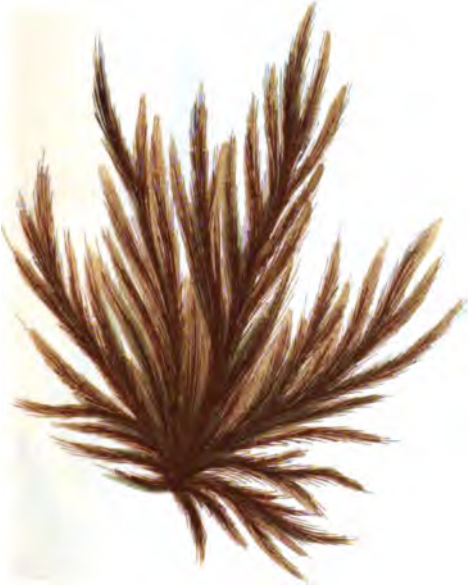
Fronds very much branched, slender; branches scattered, patent, with taper, hyaline extremities; the upper ones only opposite, short. Thecæ lateral, sessile, subelliptical.

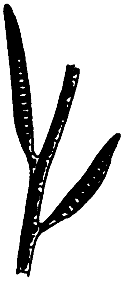
Conferva granulosa, *Smith E. B.* 2351. Ectocarpus granulosus, *Agardh Spec. Alg.* 2. 45. *Hooker Crypt. Part* 1. 326.

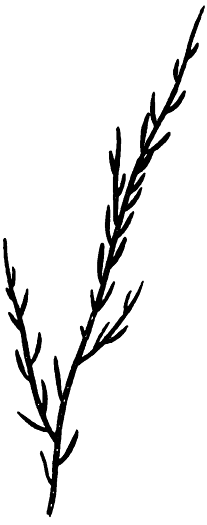
Common on the southern coast of England, attached to various submarine productions. Olive-green, somewhat resembling *E. siliculosus* in the general appearance of its tufted filaments, but differing in its mode of branching. The ultimate branches are often lengthened out into slender, colourless, nearly transparent points, whose

2319.

2432.







Ectocarpus siliculosus.

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2351

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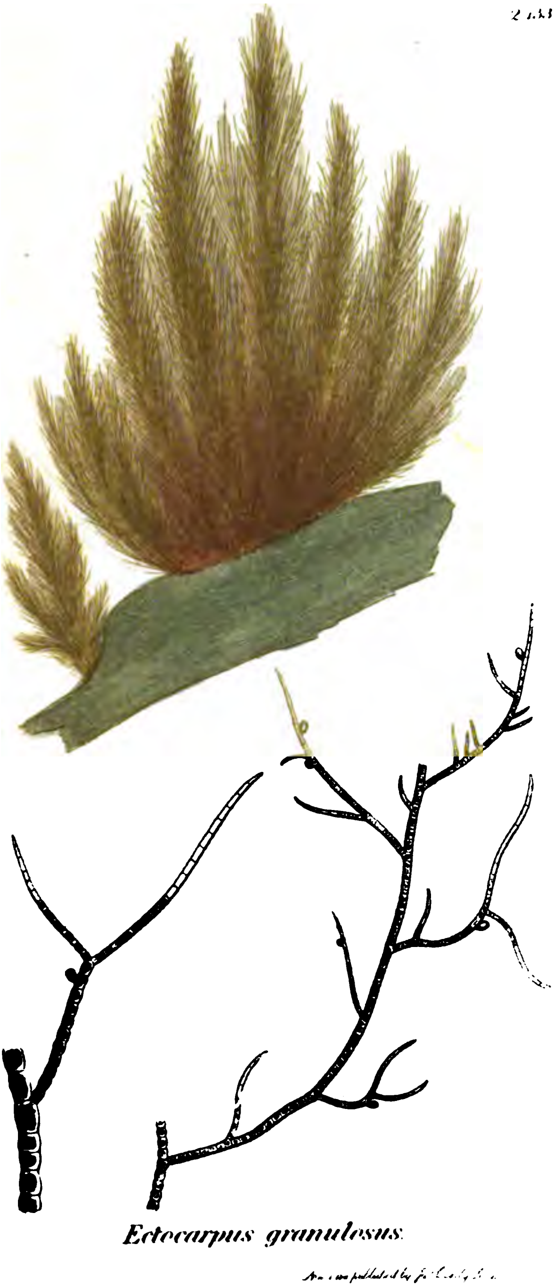

Ectocarpus granulosus.

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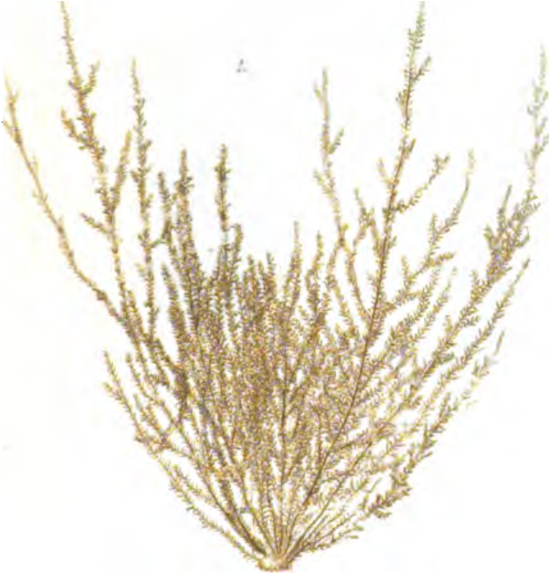
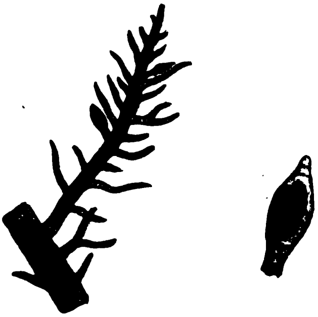
2434.





Ectocarpus Mertensii !

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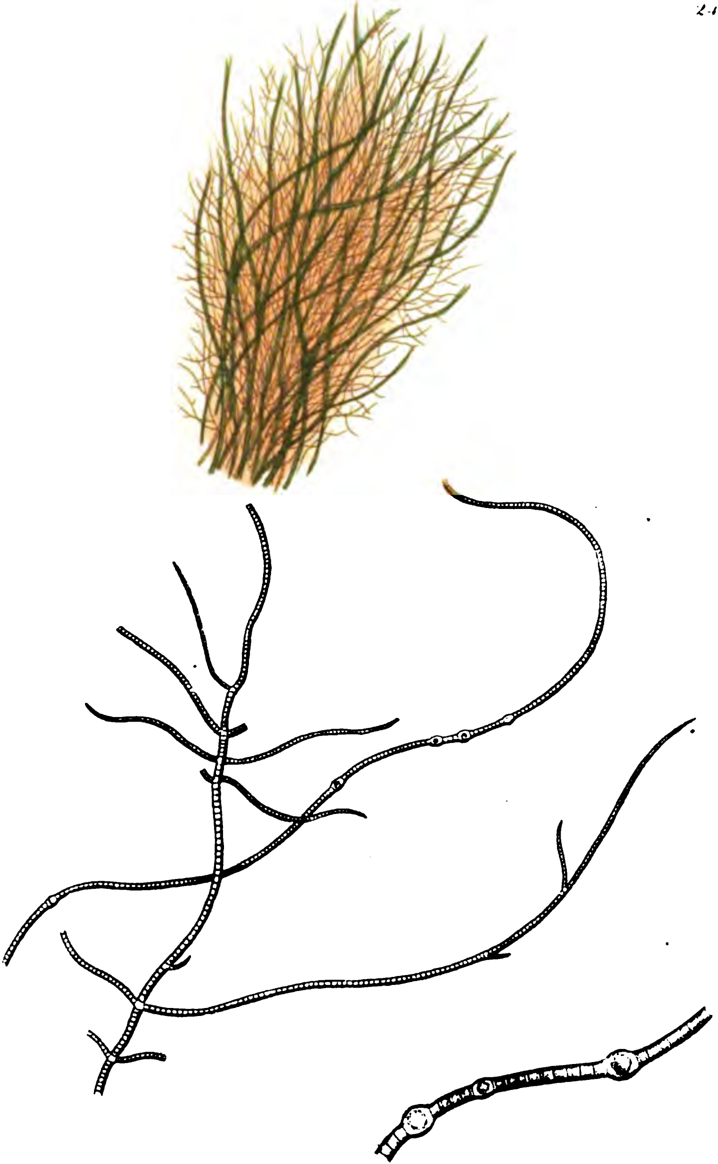
2571

2435



Ectocarpus brachiata.

[illegible] published by Jas [illegible] London

articulations are twice as long as they are broad, those of the other parts being scarcely more than half that length. Thecæ scattered on the smaller branches, solitary, brown, opake.

Tufts often a foot or more in length.

ECTOCARPUS SPHÆROPHORUS. *Round-fruited Ectocarpus.*

"Filaments slender, tufted; upper branches patent, opposite or in fours. Thecæ globose, opposite to each other or to a branch."

Ectocarpus sphærophorus, *Carmichael in Hooker Crypt. Part* 1. 326. E. brachiatus, *Agardh Spec. Alg.* 2. 42.

Found, growing on the larger Algæ, on the coast of Appin by Captain Carmichael, and at Sidmouth by Mrs. Griffiths; perhaps not uncommon. One to three inches long, pale yellowish-brown.

ECTOCARPUS MERTENSII. *Mertens' Ectocarpus.* TAB. **2434.**

Fronds distichous, bipinnate; pinnæ and pinnulæ opposite, unequal.

Conferva Mertensii, *Smith E. B.* 999. Ectocarpus Mertensii, *Agardh Spec. Alg.* 2. 47. *Hooker Crypt. Part* 1. 327.

Rare; chiefly found on the eastern coast of England. Fronds tufted, two or three inches high, pale olive or yellowish. Filaments cylindrical, oppositely bipinnated; pinnæ and pinnulæ distichous. Fructification, swollen vesicles in the shorter pinnulæ; appearing at first sight like oval, stalked thecæ.

ECTOCARPUS BRACHIATUS. *Brachiate Ectocarpus.* TAB. **2435.**

Fronds much-branched, slender, wavy, entangled; the branches opposite, crossing each other, widely spreading, with taper points. Articulations twice as broad as long.

Conferva brachiata, *Smith E. B.* 2571. Ectocarpus brachiatus, *Hooker Crypt. Part* 1. 327. E. cruciatus, *Agardh Spec. Alg.* 2. 44.

Found by Messrs. Turner and Hooker, in salt-marshes at Cley, Norfolk, and in ditches, near the river, at Caistor, by Yarmouth. This was at first considered by Sir J. E. Smith to be one of the many varieties of *E. littoralis*, but it differs considerably in the mode of branching, which is opposite, and more widely spreading. Light brown or tawny. The only form of fructification yet observed is equivocal, consisting in the occasional enlargement of the vesicles of the branches, as shown in our magnified figure.

TRIBE XV. CERAMIEÆ.

Marine plants of a red or purple colour, rarely brown. Fructification of two kinds, diœcious; external thecæ, and polymorphous receptacles or granules in swollen ramuli.

In the beauty and brilliancy of its species, this tribe rivals the *Floridea* of the preceding suborder. The main filaments are frequently inarticulate and more or less complex in structure, but the branches always present the simply moniliform arrangement of the vesicles which constitutes the leading character of the true *Confervæ*.

GENUS DCLXIV. POLYSIPHONIA. *Polysiphonia.*

GEN. CHAR. *Frond* partially or generally articulate, longitudinally striated with internal, parallel tubes. *Fructification* of two kinds on distinct individuals: ovate thecæ furnished with a terminal pore, or granules immersed in distorted ramuli.

The name, bestowed by Dr. Greville, from πολὺς, *many*, and σίφων, *a tube*, is admirably characteristic of the internal structure of the principal filaments. Upwards of fifty species have been enumerated, but the plants are so polymorphous or variable in development that the number is probably somewhat overrated. The colour of the frond is seldom bright, and most of the species become nearly black in drying; but the outline of many is so exceedingly elegant and varied, that in the aggregate the *Polysiphoniæ* are still a very beautiful family; they seem likewise to be a very natural one, though perhaps this character belongs to them rather as a group than as a genus.

* *Main filaments inarticulate.*

POLYSIPHONIA FRUTICULOSA. *Shrubby Polysiphonia.* TAB. 2436.

Frond creeping at the base, rigid, bushy, inarticulate; upper branches bi-tripinnate; lower ramuli squarrose; articulations of the ramuli half as long as broad; striæ anastomosing.

Fucus fruticulosus, *Wulfen*. *Turner Hist. Fuc. tab.* 227. *E. B.* 1686.
Polysiphonia fruticulosa, *Greville*. *Hooker Crypt. Part* 1. 327.
Hutchinsia Wulfenii, *Agardh Sp. Alg.* 2. 95.

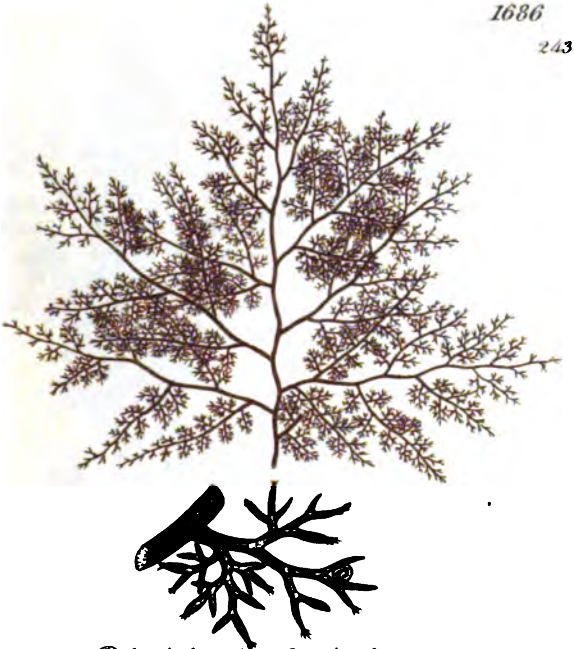
Not uncommon on sand-covered rocks, or epiphytic on the larger Algæ, especially on the southern shores of England and Ireland. Fronds dark brown, bushy, one to three inches high, capillary, cylindrical or slightly compressed, alternately and repeatedly pinnate; the ultimate segments divaricated, acute, often tipped with tufts of minute, pale, woolly fibres. Thecæ roundish, sessile, lateral on the ultimate ramuli.

POLYSIPHONIA BRODIÆI. *Brodie's Polysiphonia.* TAB. 2437.

Frond rigid, cartilaginous, repeatedly branched; branches alternately pinnated with spreading, multifid, fasciculated, flaccid ramuli; articulations of the ramuli rather longer than broad.

1686

2436

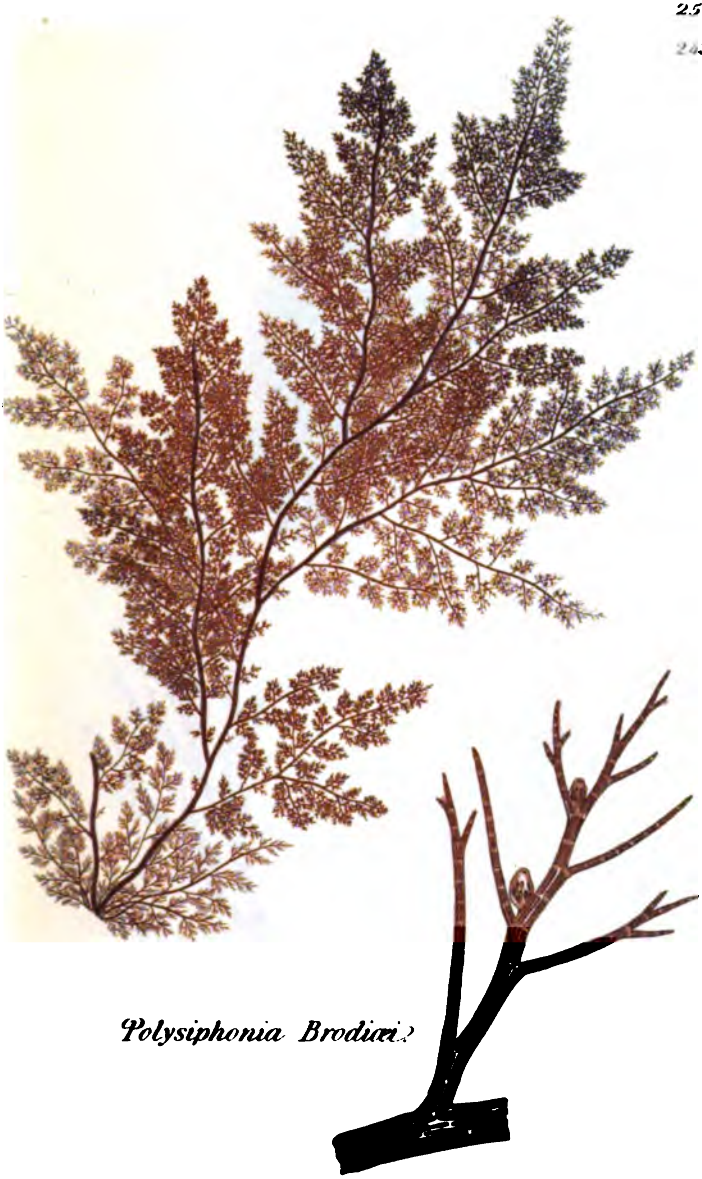


Polysiphonia fruticulosa.?

Dec.1.1806. Publish'd by Ja.s Sowerby, London.

2589

2437.

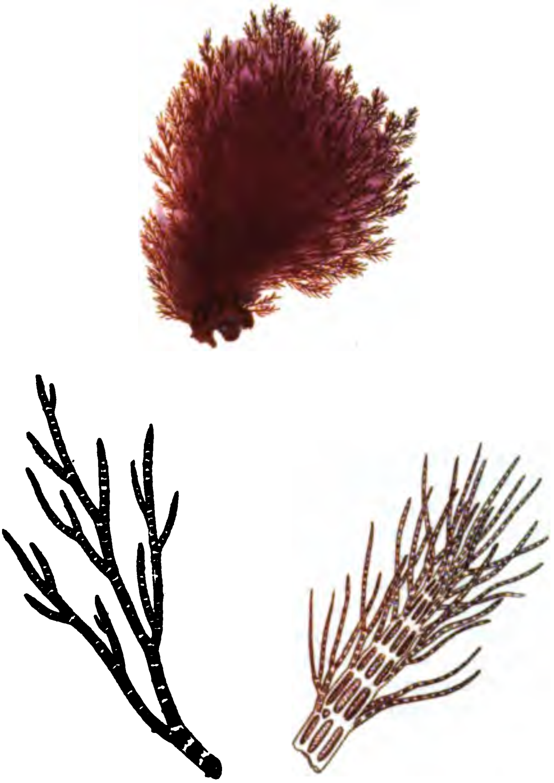


Polysiphonia Brodiaei.

Nov. 1812, published by Jas. Sowerby London.

2139

2138.



Polysiphonia fibrata?

Ap 1 1810 published by J. Sowerby London.

Conferva Brodiæi, *Dillwyn Conf. tab.* 107. *E. B.* 2589. Polysiphonia Brodiæi, *Greville. Hooker Crypt. Part* 1. 328. Hutchinsia Brodiæi, *Agardh Sp. Alg.* 2. 63.

Frequent on rocks and epiphytic on the larger Algæ, chiefly on the western and southern coasts of Great Britain and Ireland. Fronds one to two feet in length, repeatedly and very finely branched; the ultimate tufts of ramuli, in which alone the articulated structure is visible, are exceedingly delicate and beautiful. Thecæ ovate, semi-pellucid, sessile, lateral or axillary among the minute, ultimate segments.

A beautiful species, adhering firmly to paper in drying, but so delicate in texture and liable to decompose, that it is with difficulty preserved.

β. subsimplex. Less branched, darker, and more rigid. *Hooker Crypt. Part* 1. 328. Hutchinsia penicillata, *Agardh Sp. Alg.* 2. 65.

** *Filaments articulated throughout.*

POLYSIPHONIA FIBRATA. *Bearded Polysiphonia.* TAB. **2438.**

Fronds setaceous, loosely branched, flexuose, bistriate; ramuli dichotomous, fasciculate; axils patent; upper articulations longer than broad. Thecæ ovate, pedunculate.

Conferva fibrata, *Dillwyn Conf. Syn.* 84. *tab. G. E. B.* 2139. Polysiphonia fibrata, *Hooker Crypt. Part* 1. 329. Hutchinsia roseola? *Agardh Sp. Alg.* 2. 92.

Found on various parts of the coast, attached to larger Algæ, especially to *Fucus serratus*, and probably not uncommon. The fronds form dense tufts of a purple-red colour, very flaccid, and subgelatinous; they are setaceous, much-branched, the lower branches alternate or scattered, the upper ones crowded, the axils all obtuse. Thecæ ovate, dark-coloured, scattered on the terminal ramuli, generally supported on short peduncles; less frequent than the granular form of fructification. This is an exceedingly variable plant in regard to size, being found from two inches to a foot in length, and presenting as much diversity in the comparative length of the articulations, which in some specimens is not greater than their breadth, while in others it exceeds it several times.

OL Y SIPHONIA STRICTA. *Straight Polysiphonia.*

Fronds densely cæspitose, setaceous, flaccid, bistriate, dichotomous; branches and ramuli straight, erect; axils acute; upper articulations four or five times longer than broad. Thecæ ovate, sessile.

Polysiphonia stricta, *Greville. Hooker Crypt. Part* 1. 329. Hutchinsia stricta, *Agardh Sp. Alg.* 2. 89. Conferva stricta, *Dillwyn Conf. tab.* 40.

Not unfrequent on the rocky parts of our sea-shores, forming densely entangled, dull purplish tufts, very variable in height like those of the preceding species, and often half-buried in sand.

POLYSIPHONIA urceolata. *Pitcher-fruited Polysiphonia.* Tab. 2439.

Fronds rigid, cartilaginous, much-branched, loosely entangled; branches dichotomous, erecto-patent, bistriate; middle articulations four or five times longer than broad. Thecæ urceolate, shortly pedunculate.

Conferva urceolata, *Dillwyn Conf. Syn. t. G.* *E. B.* 2365. Polysiphonia urceolata, *Greville.* *Hooker Crypt. Part* 1. 330.

Common on rocks and growing on the larger Algæ. Fronds loosely tufted and entangled; the filaments about the thickness of horse-hair, very rigid, dark reddish-purple when moist, black when dry. Thecæ lateral, small, nearly sessile, finely dotted, subglobular, but terminating in a short, cylindrical extremity, like the neck of a pitcher.

Equally variable in height or length as are the two preceding, and often, as in our figure, polystriate.

POLYSIPHONIA patens. *Patent Polysiphonia.*

Fronds cartilaginous, sparingly branched, entangled, beset with short, patent, recurved ramuli, bistriate; middle articulations two or three times longer than broad. Thecæ ŭrceolate, subsessile.

Polysiphonia patens, *Greville.* *Hooker Crypt. Part* 1. 330. Hutchinsia patens, *Agardh Spec. Alg.* 2. 71. H. urceolata, *Lyngbye Hydroph. Dan. tab.* 34.

Common on the stems and about the bases of *Laminaria digitata, saccharina,* and *bulbosa.* The difference in habit between this and the last species is sometimes very remarkable, but there does not appear to be any positive feature of distinction between them.

POLYSIPHONIA parasitica. *Parasitic Polysiphonia.* Tab. 2440.

Fronds rigid; branches distichous, bi-tripinnate; pinnulæ alternate, erect, spiniform; articulations as long as broad, polystriate.

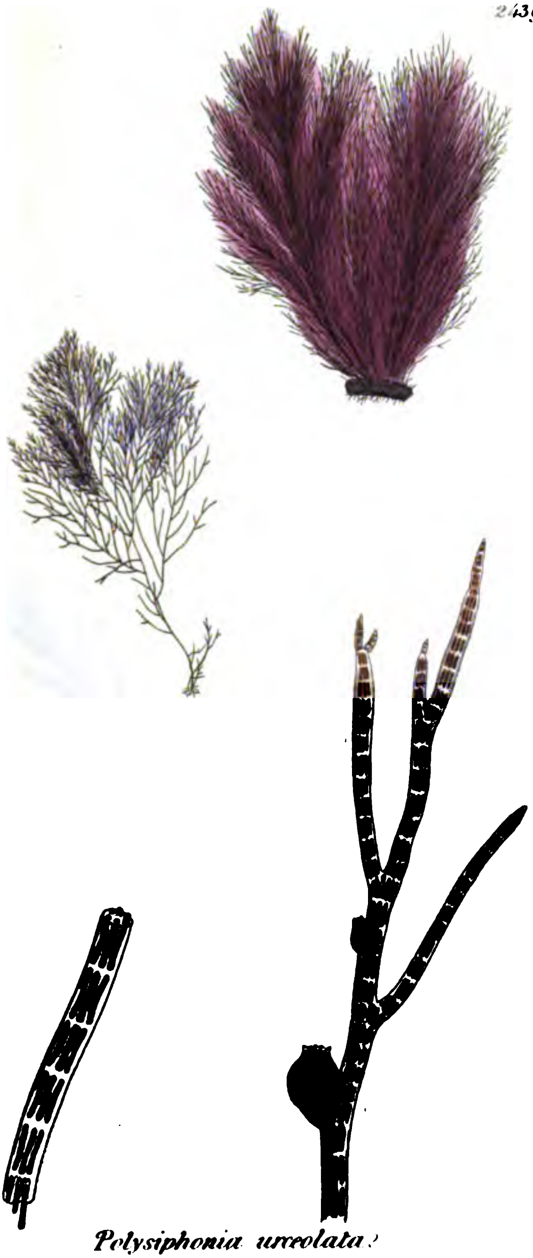
Conferva parasitica, *Hudson.* *E. B.* 1429. *Dillwyn Conf. Syn.* 87. Polysiphonia parasitica, *Greville.* *Hooker Crypt. Part* 1. 330. Hutchinsia parasitica, *Agardh Spec. Alg.* 2. 103. H. Mœstingii, *Lyngbye Hydroph. Dan. tab.* 36.

Found occasionally on various parts of the coast, growing on rocks as well as epiphytic on the larger species of Algæ. Fronds deep purplish-red, from one to two inches high, very slender, alternately branched; branches distichous, doubly and alternately pinnated, their ultimate segments acute. The whole plant is of a cartilaginous texture and does not adhere to paper in drying. The smaller branches are often studded here and there with minute granular bodies: the oblong, axillary thecæ seem to be of rare occurrence.

Liable to be confounded with small varieties of *Ptilota plumosa,* but readily distinguished by its more rigid texture and alternate pinnules.

2365

2439



Polysiphonia urceolata?

[illegible] published by Jas Sowerby London

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ENTEROMC
TAB. 2408

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ENTEROMORPH
TAB. 2409.

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about the mouths of

POLYSIPHONIA URCEOLATA. *Pitcher-fruited* [illegible]
TAB. 2403.

Frond rigid, cartilaginous, much-branched, loosely [illegible] branches dichotomous, erecto-patent, bistriate; middle [illegible] four or five times longer than broad. Thecæ urceolate, [illegible] pedunculate.

Conferva urceolata, *Dillwyn Conf. Syn. t. G.* *E. B. 2365.* [illegible] siphonia urceolata, *Greville.* *Hooker Crypt. Part* 1. 330.

Common on rocks and growing on the larger Algæ. Fronds [illegible] tufted and entangled; the filaments about the thickness of [illegible] hair, very rigid, dark reddish-purple when moist, black [illegible] Thecæ lateral, small, nearly sessile, finely dotted, subglobose, terminating in a short, cylindrical extremity, like the neck [illegible] pitcher.

Equally variable in height or length as are the two preceding, often, as in our figure, polystriate.

POLYSIPHONIA PATENS. *Patent Polysiphonia.*

Frond [illegible] branched, entangled, beset with [illegible] bistriate; middle articulations two or [illegible] Thecæ urceolate, subsessile.

[illegible] *Hooker Crypt. Part* 1. 330. [illegible] Fig. 271. H. urceolata, Lyngb. [illegible]

Common [illegible] about the bases of *Laminaria* dig[illegible] The difference in habit between the [illegible] very remarkable, but there does [illegible] distinction between them.

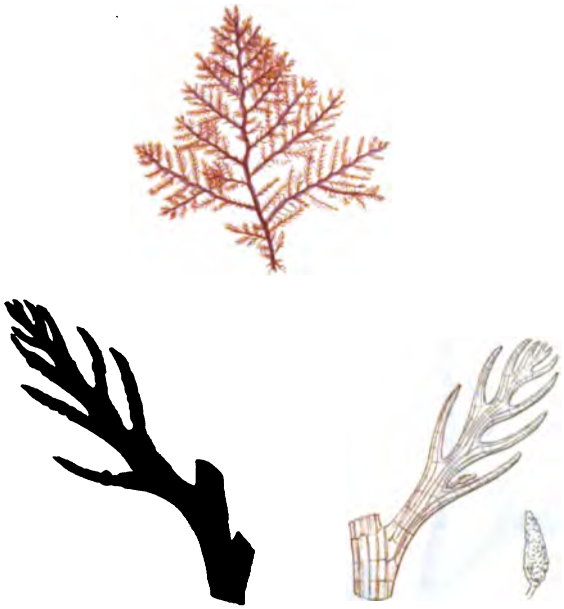
[illegible]
[illegible]

[illegible] *Dillwyn Conf. Syn.* [illegible] *Hooker Crypt. Part* 1. [illegible]

[illegible] parts of the coast, growing on [illegible] species of Algæ. Fronds [illegible] very slender, [illegible] and alternately pinnated, [illegible] The whole plant [illegible] The smaller branches [illegible]

1429

2440

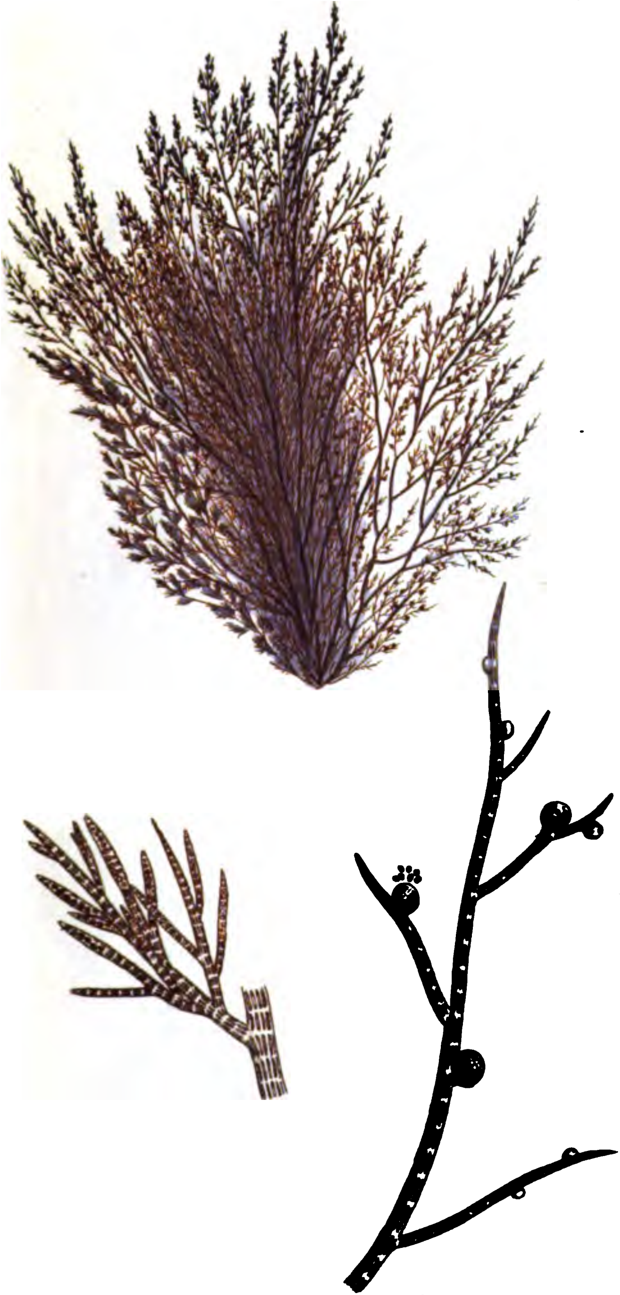


Polysiphonia parasitica?

March 1 1805 Published by Jas Sowerby London.

2340

2441

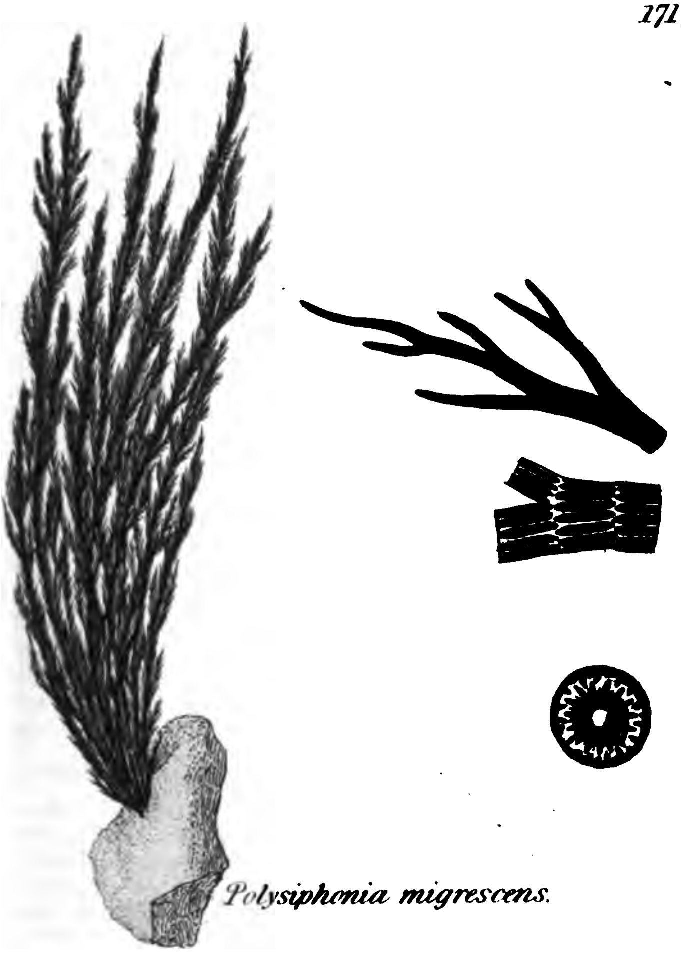


Polysiphonia atro-rubescens.

[illegible]

1717

2442.



Polysiphonia migrescens.

Mar. 1. 1807. Publish'd by Ja.s Sowerby London.

POLYSIPHONIA ATRO-RUBESCENS. *Dark-red Polysiphonia.* TAB. 2441.

Fronds elongated, sparingly branched, rigid; ramuli short, subfasciculate or scattered, subulate, erect; lower articulations twice or thrice as long as broad, upper ones only half as long. Thecæ ovate, pedunculate or sessile.

Conferva nigra, *Hudson. E. B.* 2340. *Dillwyn Conf. Syn.* 86. C. atro-rubescens, *Dillw. Conf. tab.* 70. Polysiphonia atro-rubescens, *Greville. Hooker Crypt. Part* 1. 331. Hutchinsia atro-rubescens, *Agardh Spec. Alg.* 2. 64.

Frequent on the southern coasts of England, growing in tufts upon the rocks, which in many places are almost wholly covered by it. Branches about the thickness of horse-hair, generally beset with short, subulate, more or less clustered, erect ramuli. Thecæ solitary, scattered laterally on branches that are alternately subdivided; subglobose, truncated at the summit, and discharging the pyriform sporules through a wide aperture. Colour a deep brownish-red, changing to black in drying. Adheres slightly to paper. Two to six inches high.

P. Agardhiana, *P. badia*, and *P. denudata*, of Dr. Greville, appear to be varieties of this very diversified species, differing chiefly in the mode of branching and in the comparative length of the articulations, features upon which little dependence can be placed in arranging the species of this genus.

POLYSIPHONIA VIOLACCEA. *Purple Polysiphonia.*

"Filaments flaccid, much and fasciculately branched upwards; branches subdichotomous, patent; ramuli scattered, elongated, subsimple; middle articulations three or four times, upper twice as long as broad. Thecæ shortly pedicellate, subovate."

Polysiphonia violacea, *Greville. Hooker Crypt. Part* 1. 332. Hutchinsia violacea, *Agardh Spec. Alg.* 2. 76.

Found by Captain Carmichael at Appin, Scotland, and by Mrs. Griffiths at Elberry Cove, Devon. "Probably common." Threeor four inches high, dull red; substance flaccid, adhering to paper in drying. Thecæ ovate or suburceolate, scattered over the ramuli.

POLYSIPHONIA NIGRESCENS. *Dark Polysiphonia.* TAB. 2442.

Fronds tufted, very rigid below, much and alternately branched; branches erect, the ultimate ones short, subulate, crowded. Lower articulations very short, the upper rather longer than broad. Thecæ ovate, sessile.

Conferva nigrescens, *Hudson. E. B.* 1717. *Dillwyn Conf. Syn.* 81. Polysiphonia nigrescens, *Greville. Hooker Crypt. Part* 1. 332. Hutchinsia nigrescens, *Agardh Spec. Alg.* 2. 69.

Common on most of our sea-shores, often covering the rocks in large patches. Plant densely tufted, of a woody texture, three to twelve inches high, reddish or purplish-brown when young and in the recent state, almost black when old or dried. Articulations short, seldom longer than they are broad. Our section shows the numerous parallel tubes, which in the larger branches form two concentric series, investing a central tube or cavity. It does not adhere to paper in drying.

Few species are more variable than this in size, habit, or general aspect.

POLYSIPHONIA FUCOIDES. *Bushy Polysiphonia.* TAB. 2443.

Fronds tufted, rigid, bushy, much-branched; branches more or less divaricated. Articulations about as broad as long. Thecæ lateral, solitary, sessile, subglobose.

Conferva fucoides, *Hudson.* *E. B.* 1743. *Dillwyn Conf. tab.* 75. Polysiphonia nigrescens, var., *Hooker Crypt. Part* 1. 332.

Nearly as common on the southern shores of England as the preceding, of which it can only be regarded as a variety. The difference in the transverse magnified section, which in this shows only a single series of parallel tubes, merely arises from the different ages of the branches examined.

POLYSIPHONIA FURCELLATA. *Forked Polysiphonia.*

"Filaments elongated, tufted, entangled, flexuose, repeatedly and closely dichotomous; axils broad, rounded; ramuli erect, apices forcipate; middle articulations three to five times longer than broad."

Polysiphonia furcellata, *Hooker Crypt. Part* 1. 332. Hutchinsia furcellata, *Agardh Spec. Alg.* 2. 91.

Found by Mrs. Griffiths and Miss Cutler, at Sidmouth, floating in the sea. "Very slender, five or six inches long. Colour bright brick-red, changing in the herbarium to a deep umber-brown. 'Substance at first firm, but becoming flaccid immediately. A most distinct and beautiful species."—*Hooker.*

POLYSIPHONIA FASTIGIATA. *Fastigiate Polysiphonia.* TAB. 2444.

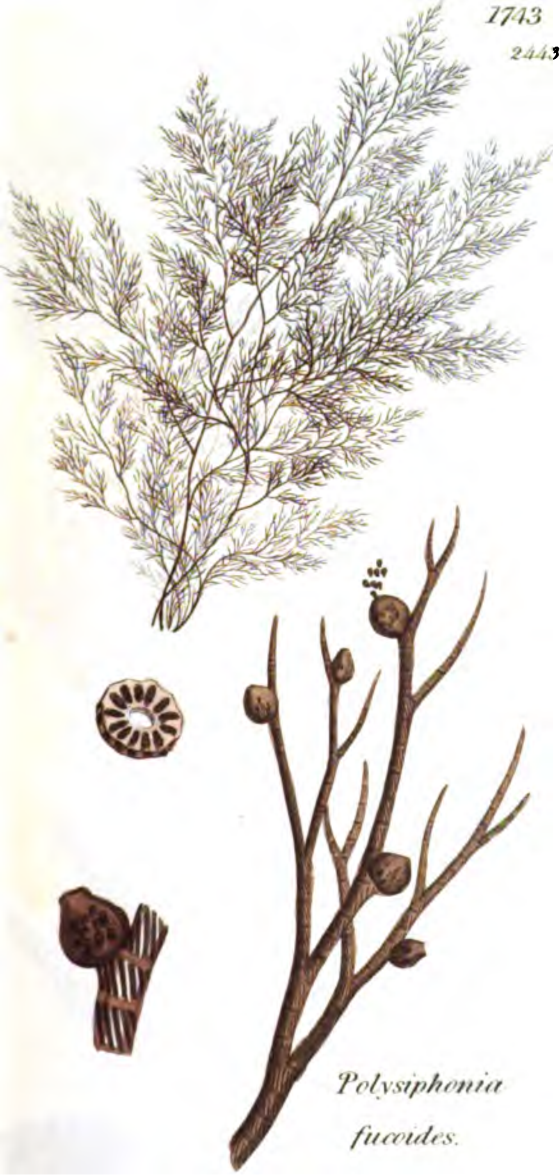
Fronds rigid, setaceous, equal, many times dichotomous; axils patent. Articulations broader than long. Thecæ ovate, solitary, sessile, about the summits of the branches.

Conferva polymorpha, *Linn.* *Dillwyn Conf. tab.* 44. *E. B.* 1764. Polysiphonia fastigiata, *Greville.* *Hooker Crypt. Part* 1. 333. Hutchinsia fastigiata, *Agardh Spec. Alg.* 2. 67.

A very common species on most parts of our coasts, epiphytic on different species of *Fucus*, especially *F. nodosus*, *serratus*, and *vesiculosus*, on which it forms dense blackish tufts, from one to three inches high, composed of innumerable tough, capillary filaments, repeatedly divided dichotomously, all the divisions rising to the same level, like those of a corymbus. Branches thickly articulated; the articulations mostly shorter than their diameter; each composed of an internal annular series of vesicles, and the whole pervaded by a central jointed and nodulous filament, as shown in the magnified sections in our figure. The central nodules occasionally enlarge, especially in the small, dichotomous extremities of the branches, giving them a pod-like appearance.

1743

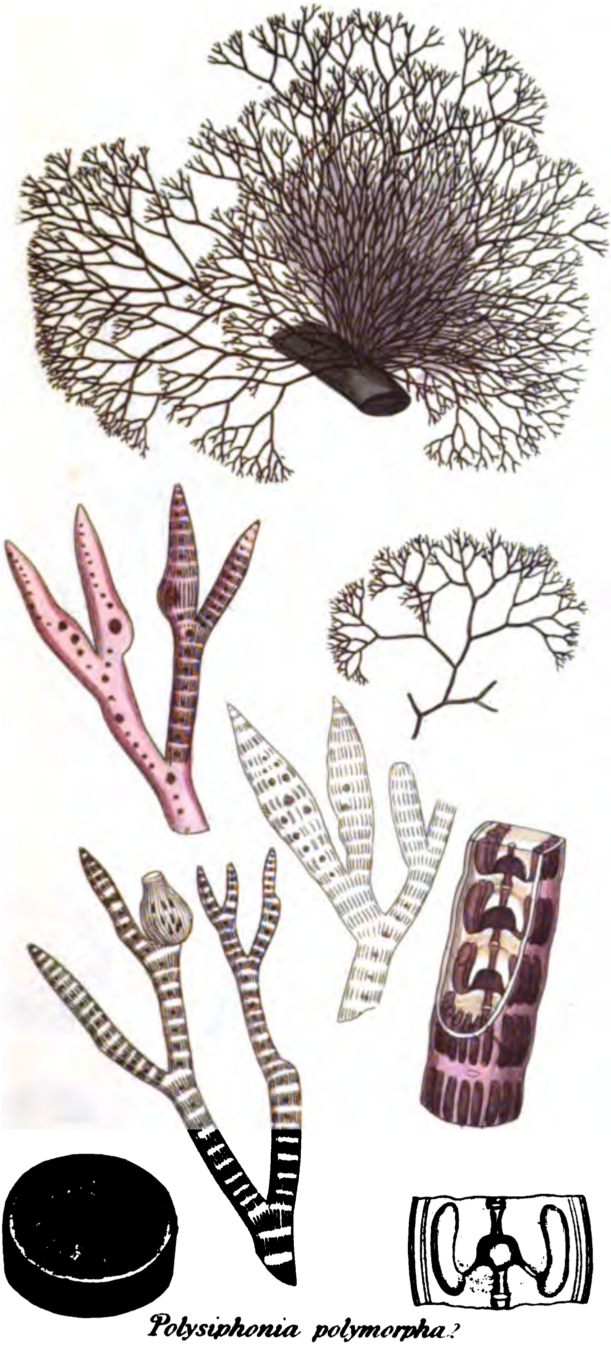
2443.



Polysiphonia fucoides.

May 1 1807. Publish'd by Jas. Sowerby London.

1764
2444.

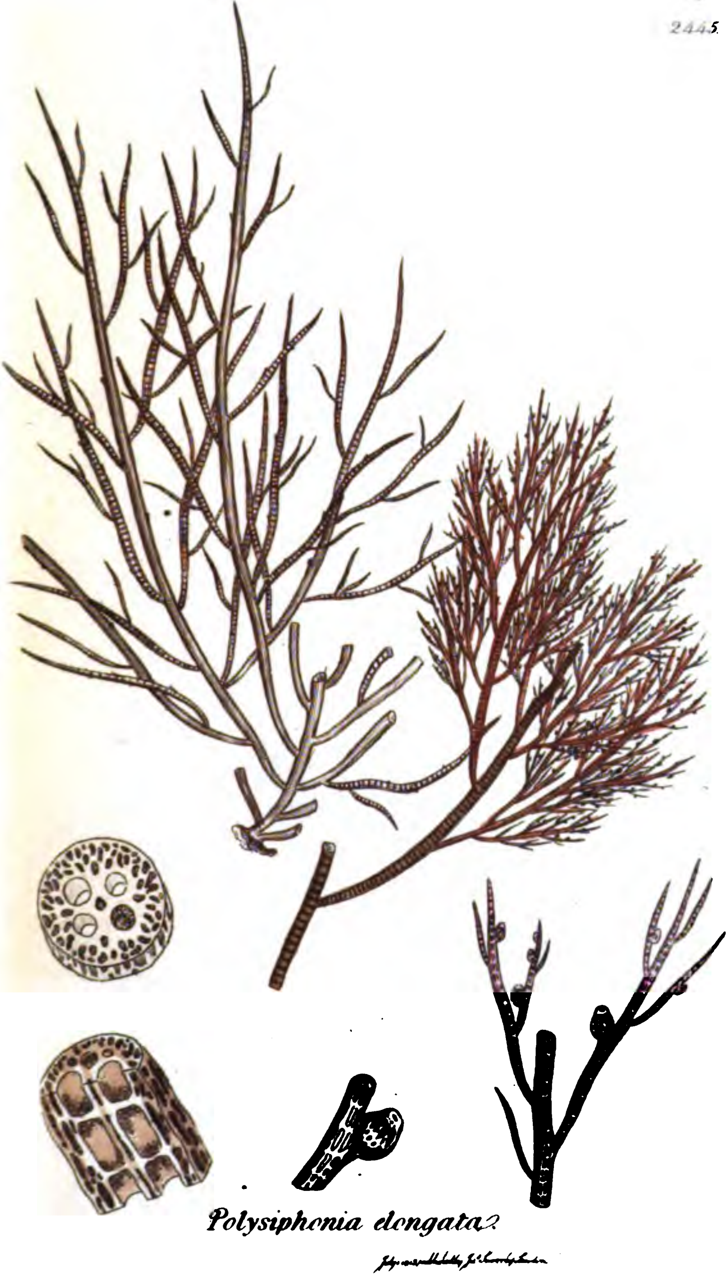


Polysiphonia polymorpha?

July 1. 1807 published by Jas. Sowerby London

2429

2445

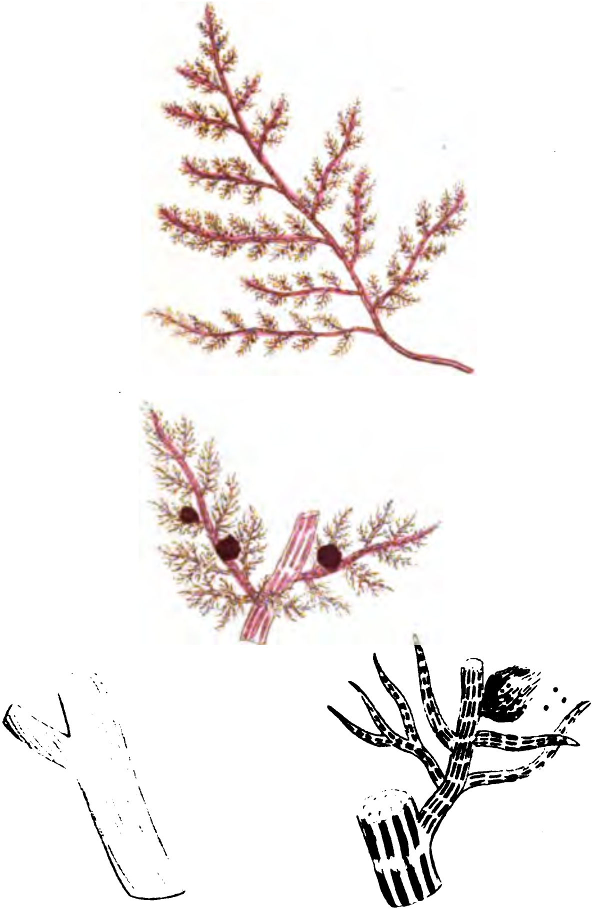


Polysiphonia elongata?

[illegible]

547.

2446.



Polysiphonia byssoides.

[illegible]

The name, *polymorpha*, originally bestowed on this species, might with equal propriety be allotted to most other plants of the genus.

POLYSIPHONIA ELONGATA. *Lobster-horn Polysiphonia.* TAB. 2445.

Fronds shrubby, robust, cartilaginous, much-branched; ramuli attenuated at the base, more or less fasciculate and subterminal. Articulations much broader than long, reticulated with veins. Thecæ lateral, sessile, ovate.

Conferva elongata, *Hudson. Dillwyn Conf. tab.* 33. *E. B.* 2429. Polysiphonia elongata, *Greville. Hooker Crypt. Part* 1. 333. Hutchinsia elongata, *Agardh Spec. Alg.* 2. 82. Ceramium elongatum, *Lyngbye.*

Common on rocky shores, growing on stones, shells, &c. The bushy, spreading fronds grow from a small callous base, and vary from a few inches to a foot or more in height. It is the largest, and apparently the most complex in structure of all our native species, the articulations being composed of numerous parallel tubes or vesicles, in two or more annular series, which invest four central, interrupted tubes extending through the smaller branches as well as the principal stems. Colour purplish-brown varying to crimson or rose-red. Thecæ solitary, ovate, striated, sessile on the sides of the upper ramuli.

The most variable, in size, habit, colour, and mode of branching, of all the genus, but well-charactered in almost every instance by its minutely reticulated exterior, and ramuli attenuated at the base.

The ramuli are occasionally wanting, constituting the variety β. *denudata* of Hooker, in which the filaments are generally distorted and beset with wart-like excrescences; in other specimens they are very flaccid, membranaceous, and crowded in broad dense fasciculi about the extremities of the branches, as in *P. rosea* of Dr. Greville, to which undoubted variety of the present species, *P. elongella*, Hooker Crypt. Part 1. 334. appears to belong, notwithstanding the alleged differences.

POLYSIPHONIA BYSSOIDES. *Byssoid Polysiphonia.* TAB. 2446.

Fronds cartilaginous; branches decomposito-pinnate, alternate, patent, crowded; ramuli capillary, multifid, simple-celled, byssoid. Articulations of the stem three- or four-striate, much longer than broad.

Conferva byssoides, *E. B.* 547. *Dillwyn Conf. tab.* 58. Polysiphonia byssoides, *Greville. Hooker Crypt. Part* 1. 334. Hutchinsia byssoides, *Agardh Spec. Alg.* 2. 99.

Found abundantly on many parts of the southern and eastern coasts of England and Ireland, but of comparatively rare occurrence elsewhere. One of the most elegant species of the genus, remarkable for the delicate dichotomous fibres, each formed of a single series of cellules, arising from the articulations of the penultimate branches. Colour bright red in the recent state, but fading to a pale brown in drying. Thecæ globular, sessile on the smaller branches among the byssoid filaments, pellucid; sporules subpyriform, deep red.

GENUS DCLXV. DASYA. *Dasya.*

GEN. CHAR. Main filaments inarticulate, cartilaginous, beset with articulated, penicillate or pinnate ramuli. *Fructification*; conico-acuminate thecæ discharging the sporules through a terminal pore, or lanceolate receptacles containing granules set in transverse fasciæ.

The plants comprised in this small genus, established by Agardh, approach in the compound structure of their stems and main branches to *Polysiphonia*, especially to *P. byssoides*; in other respects they are very closely allied to *Ceramium*. The name, from δασὺς, *hairy*, is expressive of the fine, hair-like ramuli.

DASYA COCCINEA. *Scarlet Dasya.* TAB. 2447.

Stems rough, irregularly branched; branches bipinnate; ultimate pinnules multifid. Articulations of the ramuli as long as broad. Thecæ solitary, ovate.

Conferva coccinea, *Hudson*. *E. B.* 1055. *Dillwyn Conf. tab.* 36. Dasya coccinea, *Agardh Spec. Alg.* 2. 119. *Hooker Crypt. Part* 1. 335. Hutchinsia coccinea, *Agardh Syst. Alg.*

Very common on the rocky shores of England and Ireland, but comparatively rare on those of Scotland. A highly elegant species, not excelled in its more perfect forms by any marine production, either in brilliancy of colour, or in the delicate division of the frond. Fronds from three to nine inches high, rising from a small callous base, more or less irregularly or palmately branched, the branches doubly or trebly pinnatifid, and ultimately beset with minute, multifid, tufted ramuli, among which the ovate, somewhat elongated thecæ are developed. Colour various shades of purple and crimson, the extremities, and sometimes the whole plant, of the most vivid scarlet in the recent state. It adheres to paper in drying, but loses much of its brilliancy.

Varieties occasionally occur in which some botanists have sought to recognize distinct species, but so numerous are the modifications of form and habit to which this beautiful plant is liable, even in the same habitats, that the most practised eye is liable to be deceived by them.

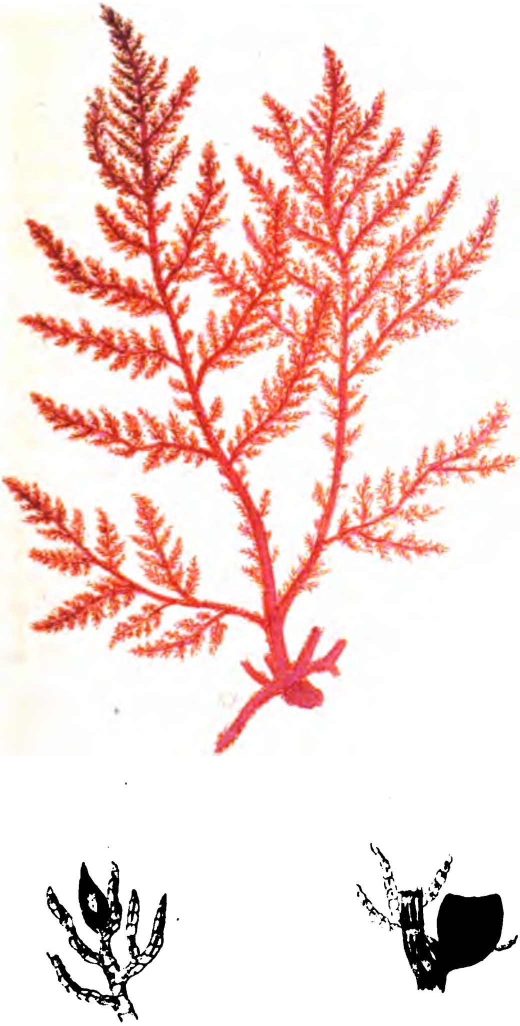
GENUS DCLXVI. CERAMIUM. *Ceramium.*

GEN. CHAR. *Frond* articulated throughout; branches mostly dichotomous, reticulated with veins; dissepiments opake. *Fructification*; membranaceous thecæ including numerous angular sporules, or simple oblong granules imbedded in the upper ramuli.

A small, but very beautiful genus of marine plants of various

1055

2447



Dasya coccinea?

Published Aug. 1. 1812 by Jas. Sowerby London

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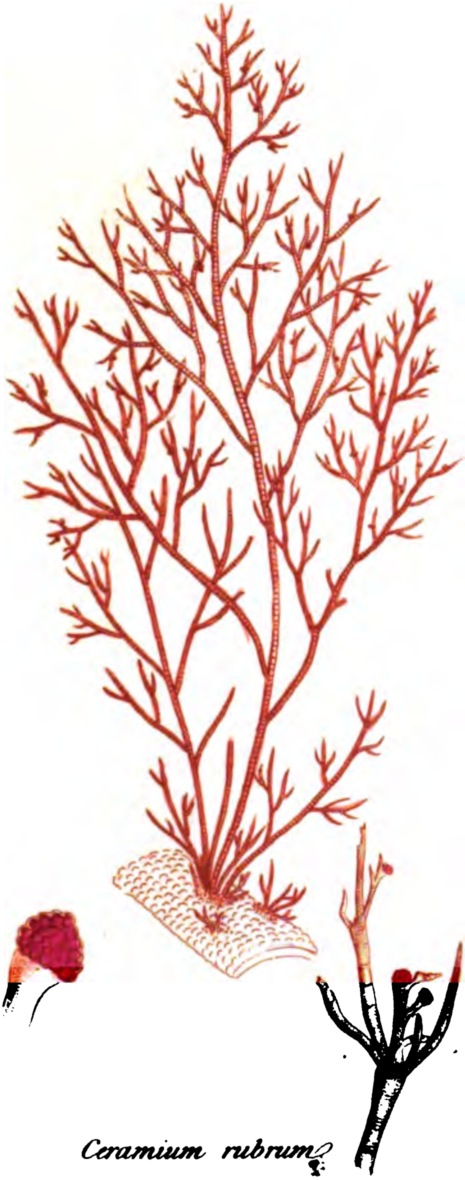
2448.

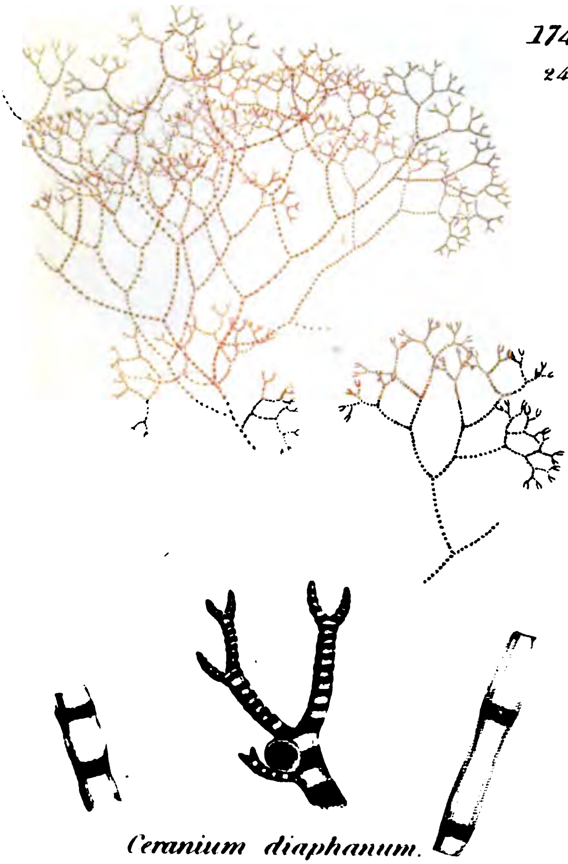


Ceramium rubrum.

May 1 1803 Published by Jas Sowerby London

1742

2449.

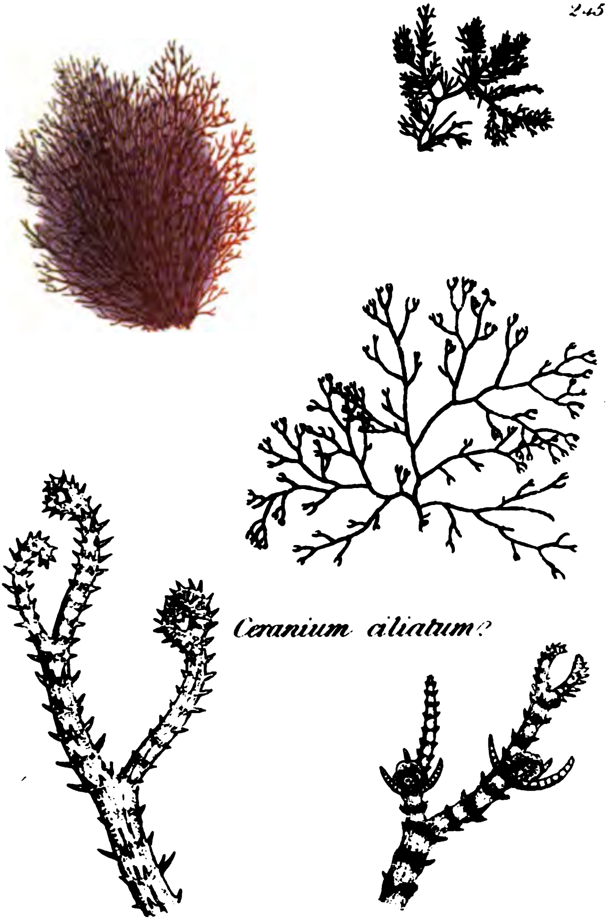


Ceramium diaphanum.

May 1. 1807. Publish'd by Jas. Sowerby, London.

2428

2450.



Ceramium ciliatum?

[illegible] published by Ja.s Sowerby London

shades of red or crimson. The name, from the Greek, *κεράμιον*, *a pitcher*, is, in reference to the form of the thecæ, far from being characteristic.

CERAMIUM RUBRUM. *Red Ceramium.* TAB. 2448.

Frond cartilaginous, reticulated. Articulations opake: dissepiments contracted.

Conferva rubra, *Dillwyn Conf. tab.* 34. *E. B.* 1166. Ceramium rubrum, *Agardh Spec. Alg.* 2. 146. *Hooker Crypt. Part* 1. 336.

Found on most parts of the coast, and often very abundantly, growing on rocks, shells, and the larger and coarser Algæ. Fronds somewhat tufted, more or less branched; the branches slender, filamentous; the articulations generally about as broad as they are long. Thecæ sessile, solitary. Colour rose-red or crimson changing by exposure to yellowish or sand-colour. It adheres to paper in drying, but not very firmly. Very variable in its mode of branching.

CERAMIUM DIAPHANUM. *Red-dotted Ceramium.* TAB. 2449.

Fronds flaccid, regularly and repeatedly dichotomous. Articulations hyaline; joints swollen, opake.

Conferva diaphana, *Dillwyn Conf. tab.* 38. *E. B.* 1742. Ceramium diaphanum, *Agardh Spec. Alg.* 2. 150. *Hooker Crypt. Part* 1. 336.

A smaller and generally much more delicate species than the preceding; common on most shores, growing on other Algæ. Branches repeatedly forked and divaricated, the ultimate ones frequently curved inwards resembling a pair of pincers: articulations usually twice as broad as they are long, but in some branches as much the reverse, pellucid, shining, and almost colourless, except at each end, where the dissepiments are placed, in which parts the endochrome is collected forming a ring of deep red colour, so that the plant looks, when laid on paper, as observed by Lightfoot, like "a branched series of small red dots." Thecæ subglobose, lateral or axillary, solitary, sessile, exhibiting the deep red sporules through the thin, colourless membrane. The beautifully variegated filaments, which are often finer than hair, render this species one of the most elegant of the smaller marine plants.

CERAMIUM CILIATUM. *Spiny Ceramium.* TAB. 2450.

Fronds rigid, brittle at the joints, repeatedly dichotomous. Joints furnished with whorled or solitary, prickle-like processes.

Conferva ciliata, *Dillwyn Conf. tab.* 53. *E. B.* 2428. Ceramium ciliatum, *Agardh Spec. Alg.* 2. 153. *Hooker Crypt. Part* 1. 336.

Common on rocks, shells, corallines, and the larger Algæ, forming little tufts, seldom more than one or two inches high, very much branched, the small ultimate branches often incurved like those of *C. diaphanum.* Articulations about as broad as long, pellucid, sometimes nearly colourless. Joints deep red, more or less set round with short, white, pellucid, spreading spines. Thecæ globular, lateral, generally in an involucrum formed by a few short branches.

Very variable in size, and in the development of the ciliary processes of the joints, which are sometimes naked or with only a single spine. The ordinary red or crimson hue passes in some specimens to a deep brown, in others to a pale rose, or even to a sand colour.

The whorled spines are seldom visible without a good lens, but the habit of the plant is very different from that of either of the two preceding. The extremities of the ultimate branchlets are frequently curved inwards in a forceps-like manner.

GENUS DCLXVII. SPYRIDIA. *Spyridia.*

GEN. CHAR. Main filaments compound, indistinctly articulated, cartilaginous, beset with articulated ramuli; dissepiments opake. *Fructification*; one- to three-seeded, hyaline thecæ, clustered about the bases of the ramuli; or, pedunculated, gelatinous receptacles, often surrounded by an involucrum of short ramuli, containing two or three masses of roundish granules.

A single species only is known, found in the temperate and tropical seas all round the world. In the structure of the principal divisions of the frond it approaches *Polysiphonia*, and has sometimes been referred to that genus, as well as to *Ceramium*, which it somewhat resembles in habit. In fructification it borders on *Griffithsia* and *Calithamnion*, especially as regards the structure of the receptacles, but is otherwise totally distinct from both. The generic name, rather fancifully adopted from the Greek, *σπυρὶς*, *a basket*, is expressive of the curious membranaceous receptacles with their parcelled contents.

SPYRIDIA FILAMENTOSA. *Hairy Spyridia.* TAB. **2451**.

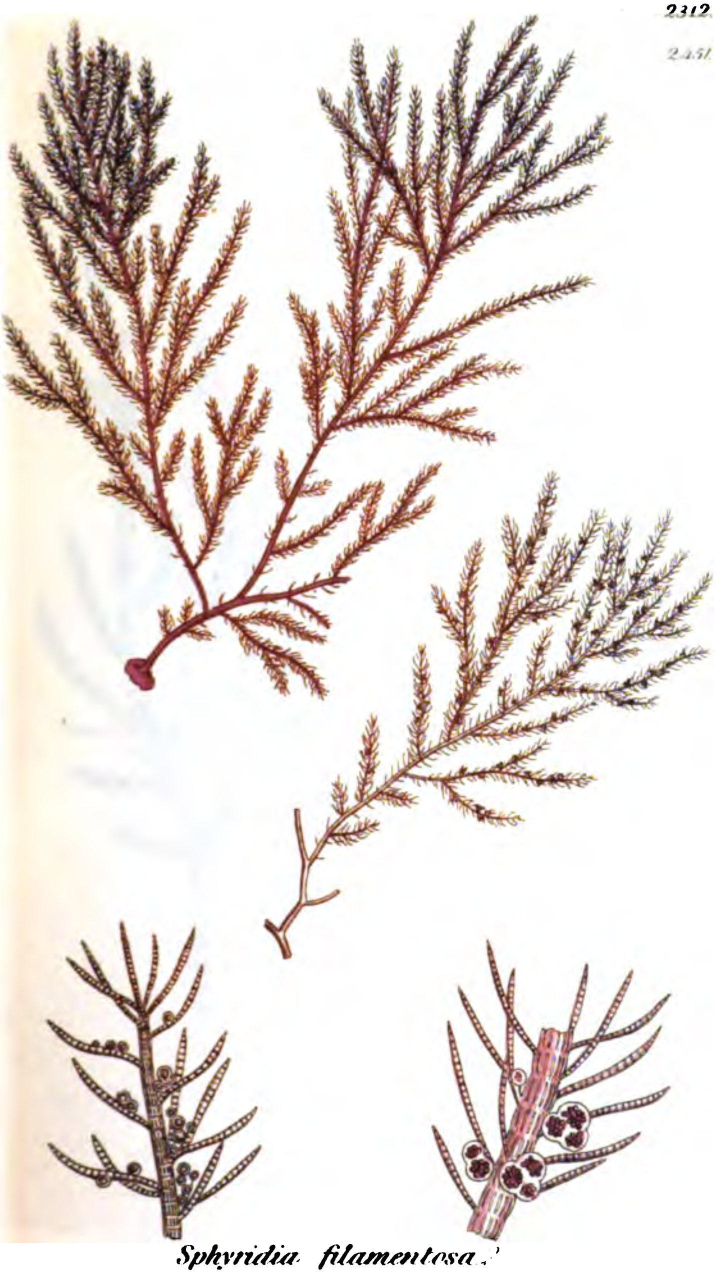
Conſerva Griffithsiana, *Smith. E. B.* 2312. Spyridia filamentosa, *Harvey. Hooker Crypt. Part* 1. 337. Ceramium filamentosum, *Agardh Spec. Alg.* 2. 141. Fucus filamentosus, *Wulfen.*

Found only on the extreme southern shores of England. Fronds tufted, many springing from a small, expanded disc, three to six inches high, cartilaginous, irregularly branched; the branches beset more or less regularly with numerous short, setaceous, mostly simple ramuli, around the bases of which are produced the thecæ and receptacles. Colour red of different shades, changing to dark brown or greenish by drying. It adheres slightly to paper.

The "trisporous capsules" (thecæ) of this curious plant are, I am convinced, only modifications of the triple receptacles, or rather, they are the latter in their incipient state, as will be found by examining the plant at different seasons.

2312.

2451.

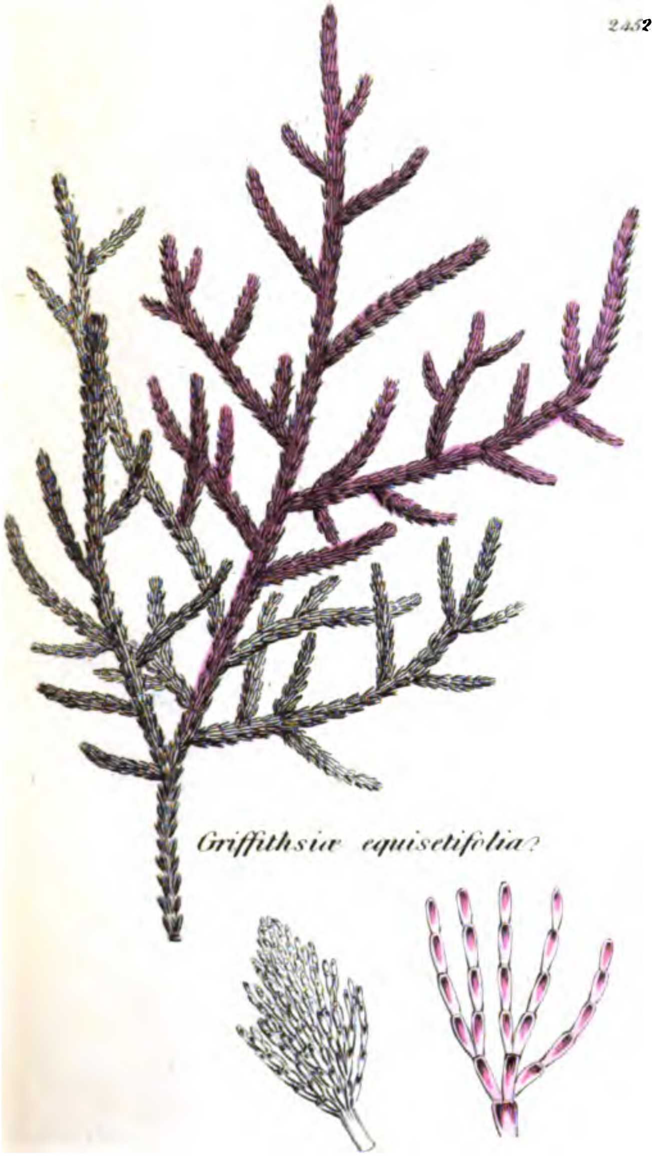


Sphyridia filamentosa.

[illegible] published by Jas. Sowerby London.

2479

2452.

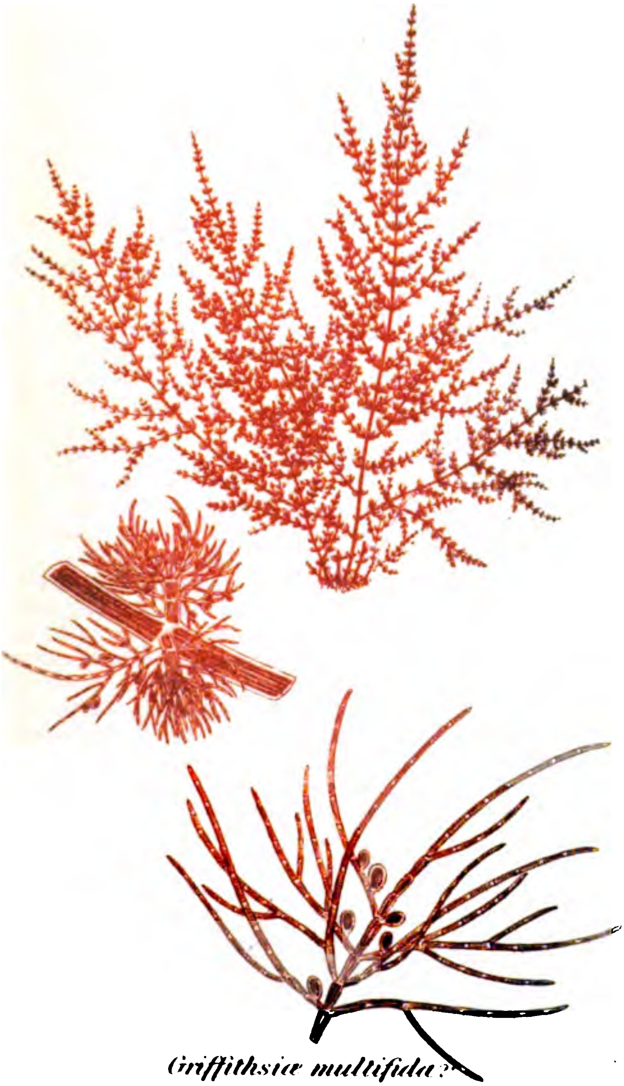


Griffithsia equisetifolia.

July 1. 1808 Published by Jas Sowerby London

1816

2.453



Griffithsia multifida?

Nov. 1 1807 Publish'd by Jas. Sowerby London.

GENUS DCLXVIII. GRIFFITHSIA. *Griffithsia.*

GEN. CHAR. *Frond* articulated throughout, mostly dichotomous; dissepiments hyaline. *Fructification*; clustered, hyaline thecæ; or roundish, gelatinous, involucrated receptacles, including minute granules.

This small genus, consisting at most of six or seven known species, was named in honour of the late Mrs. Griffiths, of Torquay, Devonshire, a lady so highly distinguished for her researches in marine vegetation, as to rank among the most celebrated cryptogamic botanists of the age.

* *Branches whorled with ramuli.*

GRIFFITHSIA EQUISETIFOLIA. *Imbricated Griffithsia.* TAB. 2452.

Fronds irregularly branched; the branches thick, clothed with whorled, imbricated, dichotomous, incurved ramuli.

Conferva equisetifolia, *Lightfoot. Dillwyn Conf. tab.* 54. *E. B.* 1479. Griffithsia equisetifolia, *Agardh Spec. Alg.* 2. 133. *Hooker Crypt. Part* 1. 337.

Abundant on most of the rocky shores of England and the west of Ireland: rare in Scotland. Fronds three inches to a foot in height, robust, much and alternately branched, of a bright red when young, changing to reddish-brown or purple. The branches are cylindrical, and uniformly clothed with densely imbricated, whorled, forked, tapering, articulated filaments. Joints contracted, redder or more deeply coloured than the other parts. The fructification is involved in much obscurity. Mr. Borrer observed in one specimen "little yellowish-brown oblong bodies, each surrounded by a pellucid limbus, scattered plentifully on the internal face of the ramuli;" and on another, "minute pale pink tufts, which appeared to grow, some laterally on the branches and some on the verticillate ramuli, whilst others terminated small young branches. The highest power of the microscope proved them to consist of two or three whorls of incurved ramuli, similar to those of the other parts of the plant, but very much more minute; to the inner side of which at the dissepiments are affixed the seeds (?), sometimes solitary, more frequently appearing clustered. These are globular; some of them dark red throughout, without a limbus; others with a very wide limbus, the colouring matter forming merely a central speck."—*Borrer in Hooker Crypt.* Some appearance of the latter kind was noted and described by Dillwyn, the chief difference appearing to consist in his supposed seeds being immersed in a pellucid jelly, which Mr. Borrer does not notice.

GRIFFITHSIA MULTIFIDA. *Multifid Griffithsia.* TAB. 2453.

Branches slender; whorls distant; ramuli dichotomous, incurved.

Conferva multifida, *Hudson*. *E. B.* 1816. *Dillwyn Conf. Syn.* 75. Griffithsia multifida, *Agardh Spec. Alg.* 2. 133. *Hooker Crypt. Part* 1. 338.

Not unfrequent on the southern coasts of England and Ireland, thrown ashore among other marine productions. Fronds tufted, springing from an apparently creeping, fibrous base, two to six inches high, about the thickness of horse-hair, or even much more slender. Branches spreading widely, variously subdivided. Articulations often from three to five times as long as broad, bearing at the joints two or three dense tufts of ramuli, variously subdivided, their divisions acute, ascending, and incurved. Thecæ elliptical, with a pellucid limbus, sessile about the lower part of the ramuli. Receptacles pedunculated. Colour, when recent, rose-red. The most beautiful plant of the genus.

** *Branches dichotomous, naked.*

GRIFFITHSIA BARBATA. *Pencilled Griffithsia.* TAB. **2454.**

Fronds setaceous, dichotomous. Articulations five or six times as long as broad; the uppermost beset with long, opposite, multifid fibres.

Conferva barbata, *Smith*. *E. B.* 1814. *Dillwyn Conf. Syn.* 75. Griffithsia barbata, *Agardh Spec. Alg.* 2. 132. *Hooker Crypt. Part* 1. 338.

Found by Mr. Borrer, on the beach at Brighton, Sussex. Fronds two or three inches high, of a pale rose-colour, repeatedly branched. Articulations swelling upwards, five or six times as long as broad, the lower ones more exactly cylindrical; those about the summit bearded with opposite, long, branched, pale, very delicate fibres. Fructification at the extremities of short, lateral, single-jointed branches; consisting of rosaceous tufts of inflexed, inarticulated filaments, infolding a mass of dark red, globular sporules or granules, imbedded in a colourless mucus.

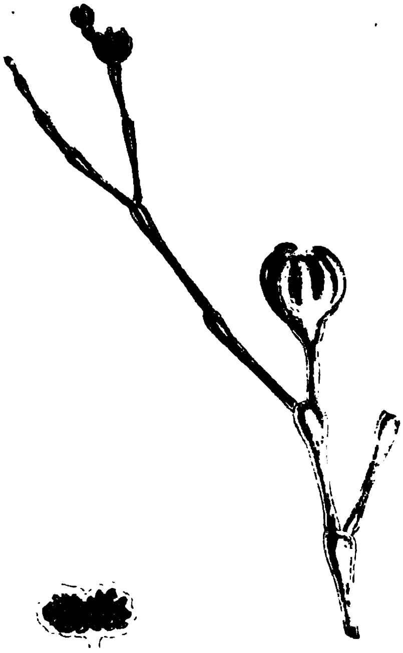
Of this rare species very little is known. It is probably only a casual visitant to our shores.

GRIFFITHSIA CORALLINA. *Coralline-like Griffithsia.* TAB. **2455.**

Fronds subgelatinous, thickish, repeatedly dichotomous; axils patent. Articulations thrice or four times as long as broad, enlarging upwards.

Conferva corallina, *Linn.* *E. B.* 1815. *Dillwyn Conf. tab.* 98. Griffithsia corallina, *Agardh Spec. Alg.* 2. 127. *Hooker Crypt. Part* 1. 338.

Common on the southern shores of England, but becoming more and more rare as we advance northward. The recent plant is of a beautiful crimson, but it turns whitish or greenish-brown in drying. Fronds two to four inches high, tufted, from a fibrous base, repeatedly but irregularly dichotomous. Articulations somewhat pear-shaped, frequently fringed round their dilated summits with short, unequal, inflexed, inarticulated filaments, within which are lodged, copiously,

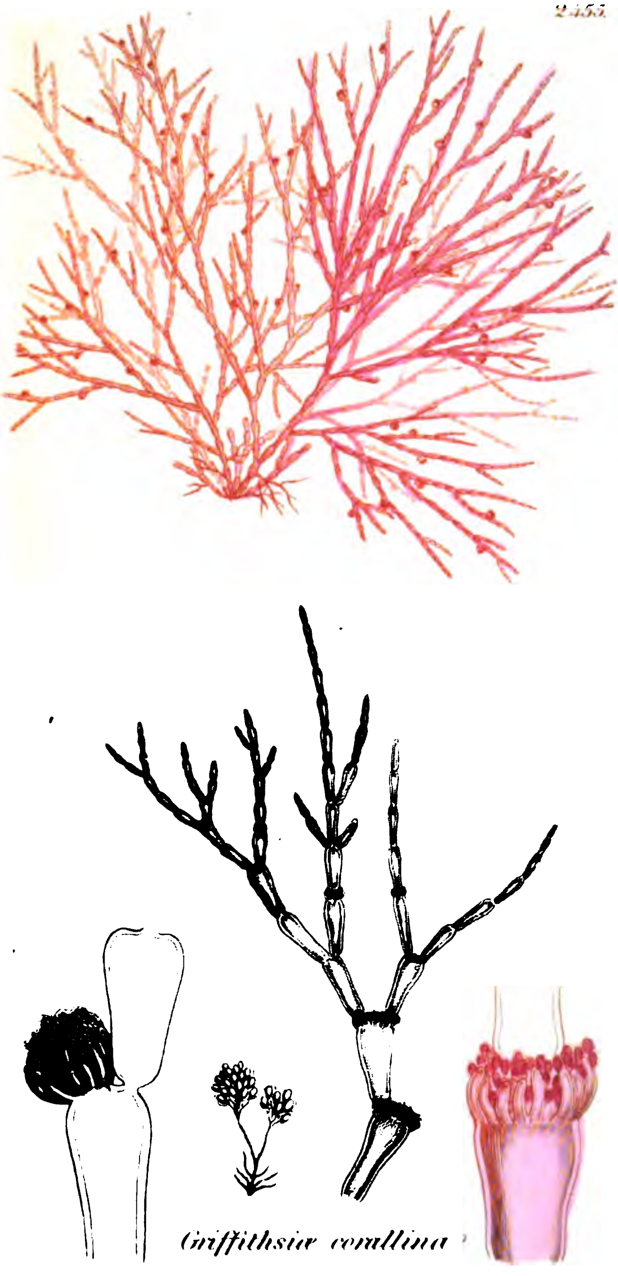


Griffithsia barbata.

Nov. 1 1807 Published by J. Sowerby London

1815

2455

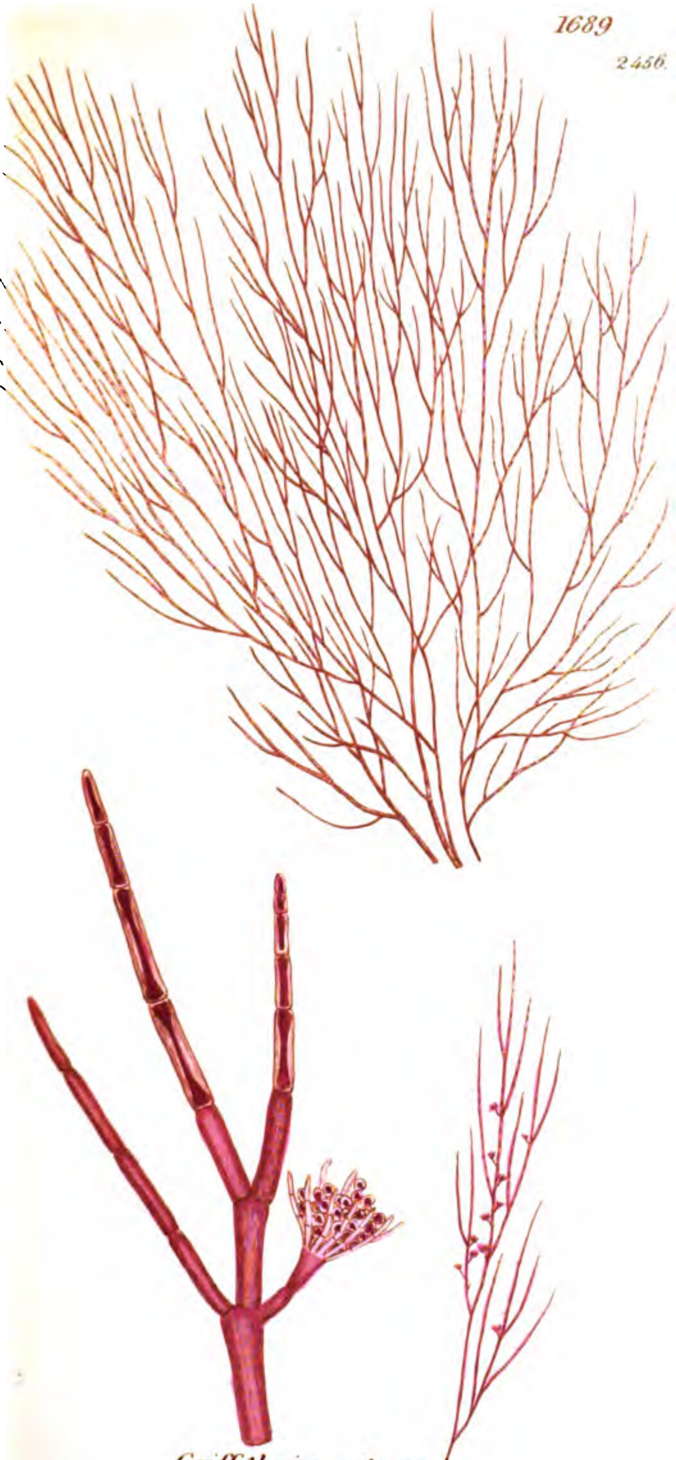


Griffithsia corallina

Nov. 1. 1807. Publish'd by Jas. Sowerby London.

1689

2456.



Griffithsia setacea.

deep crimson sporules or granules, in pedicellate, branched clusters, imbedded in mucus. Globular thecæ are found on some plants, sessile, two or more together, laterally on the joints, each containing numerous red sporules on a globular receptacle. The two kinds of fructification seem never to occur on the same plant, but it is difficult to determine which of them is normal: the former is that most frequently met with.

GRIFFITHSIA SETACEA. *Setaceous Griffithsia.* TAB. **2456.**

Fronds setaceous, repeatedly branched, subdichotomous; branches straight, rigid, their axils acute. Articulations subcylindrical, four or five times as long as broad.

Conferva setacea, *E. B.* 1689. *Dillwyn Conf. tab.* 82. Griffithsia setacea, *Agardh Spec. Alg.* 2. 129. *Hooker Crypt. Part* 1. 338.

Common on most parts of our coasts. Frond bushy, three to six inches high, repeatedly branched. Articulations sometimes enlarged a little upwards, but generally nearly cylindrical. Colour deep red, changing to brownish-yellow by exposure. Fructification in short, lateral branches, which terminate in involucra composed of many very slender, short, jointed filaments, bearing on their inner surface numerous minute, crowded, spherical, pellucid thecæ, each containing two or three dark red sporules.

In drying the colouring matter contracts into the middle of each articulation; but on washing the plant in fresh water, the vesicles frequently burst and discharge their contents into the water, giving it a red tinge. Mrs. Griffiths, as quoted by Sir W. J. Hooker, has remarked the filaments twist on being immersed, and that "the skin bursts with a slight explosion and emits the colouring matter which sinks in the form of a fine powder;" but I have frequently observed, that, after washing in several waters before committing the plant to paper, no such change has taken place, and that the discharge of the endochrome has appeared to be the result of contraction in drying; the paper of many of my specimens is tinged of a beautiful rose-colour by this curious process, the plant itself becoming of a dull brown hue, while in others the plant retains its original crimson and the paper is quite unstained. I have occasionally met with a similar phænomenon in drying specimens of *Chylocladia ovalis, Laurencia dasyphylla, Plocamium*, and other red or rose-coloured Algæ.

GENUS DCLXIX. CALITHAMNION. *Calithamnion.*

GEN. CHAR. *Frond* articulated throughout, mostly pinnated; dissepiments hyaline. *Fructification*; scattered, hyaline thecæ, produced on the ultimate ramuli; or polymorphous (roundish or lobed) gelatinous receptacles, containing large granules, seated on the main branches.

A beautiful and rather extensive genus of small marine plants, generally of a bright rose-red or crimson colour, and resembling in the elegant and complicated division of the frond miniature shrubs, whence the generic name, from the Greek, καλὸς, *beautiful*, and θάμνος, *a shrub.*

Well-distinguished from *Griffithsia* by the pinnate, not dichotomous, frond, scattered thecæ, and the general absence of involucra to the receptacles; the first character likewise, as well as the hyaline dissepiments, separates it from *Ceramium*, to which some of the species have been previously referred.

CALITHAMNION PLUMULA. *Pectinated Calithamnion.* TAB. **2457.**

Frond erect, from a scutate base, much-branched. Ramuli short, opposite, recurved, pectinated on their upper margins.

Conferva Turneri, *E. B.* 1637. C. Plumula, *Dillwyn Conf. tab.* 50. Calithamnion Plumula, *Lyngbye. Agardh Spec. Alg.* 2. 159. *Hooker Crypt. Part* 1. 339.

Not unfrequent on various parts of the coast, and readily distinguishable from the other species of the genus by the remarkable arrangement of its ultimate ramuli. Fronds bright rose-colour, repeatedly branched. Articulations cylindrical, opake, with pellucid joints. Thecæ globose, sessile between the pectinate ramuli. Receptacles lobed and clustered.

One of the most elegant and beautiful of its tribe.

CALITHAMNION TURNERI. *Turner's Calithamnion.* TAB. **2458.**

Stems erect or ascending from a creeping, filamentous base, oppositely pinnated. Articulations five times longer than broad.

Conferva Turneri, *Dillwyn Conf. tab.* 100. *E. B.* 2339. Calithamnion Turneri, *Agardh Spec. Alg.* 2. 160. *Hooker Crypt. Part* 1. 339. Ceramium Turneri, *Greville Crypt. Fl. tab.* 355.

Not uncommon, especially on the coasts of England and Ireland, growing on the larger and stouter Algæ, in dense tufts, generally about an inch high, and of a delicate rose-colour. Fronds, or main stems, suberect, linear-lanceolate in their general outline, pinnated with numerous opposite, short branches, which are sometimes simple, but more frequently irregularly pinnated with small ramuli. Thecæ globose, scattered over the upper side of the branches towards their bases, or in the axils of the ramuli.

CALITHAMNION PLUMA. *Feathery Calithamnion.*

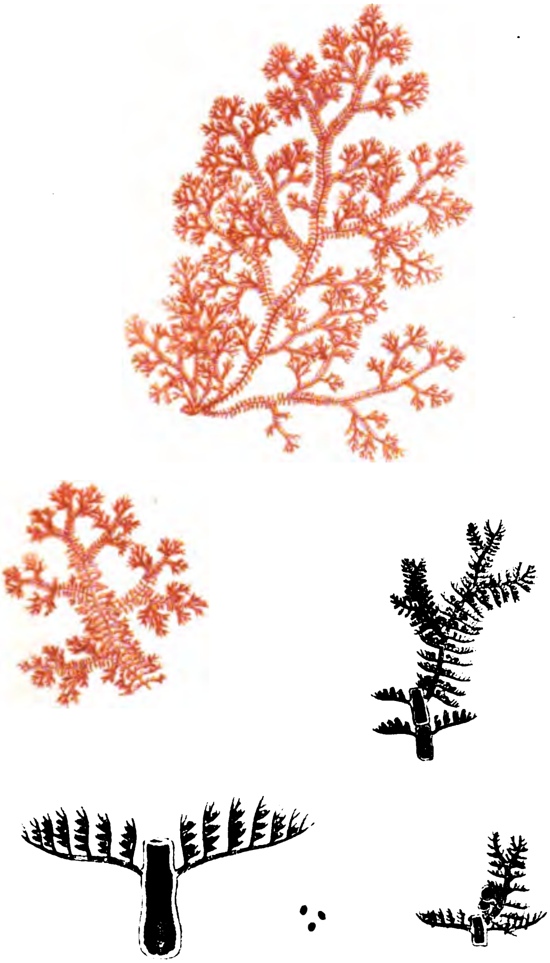
Frond creeping. Stems erect, mostly simple, naked below, oppositely pinnated above; pinnæ erect, appressed. Articulations of the stem two or three times as long as broad.

Conferva Pluma, *Dillwyn Conf. Syn.* 72. *tab. F.* Calithamnion Pluma, *Agardh Spec. Alg.* 2. 162. *Hooker Crypt. Part* 1. 340.

Frequent, especially on the southern coasts of England and Ireland, growing on the stems of *Laminaria digitata* and *Fucus nodosus.*

1637

2457.

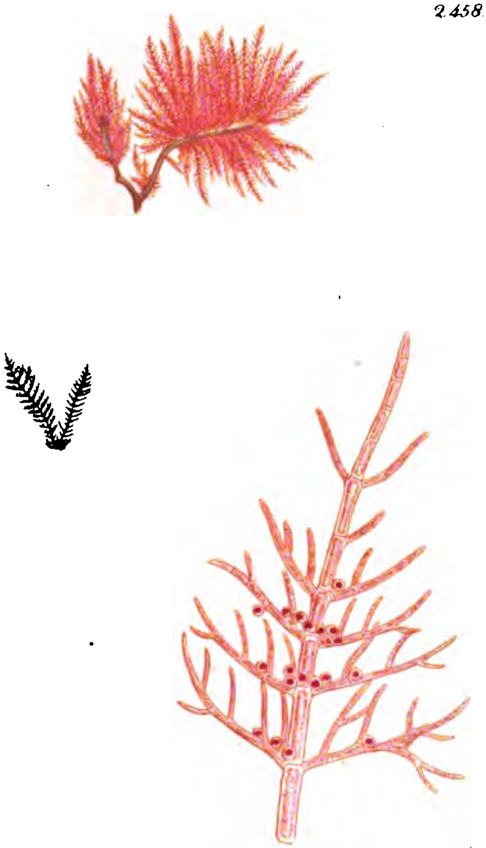


Calithamnion Plumula.

Aug 1 1806 Publish'd by Ja.s Sowerby London

2339

2458

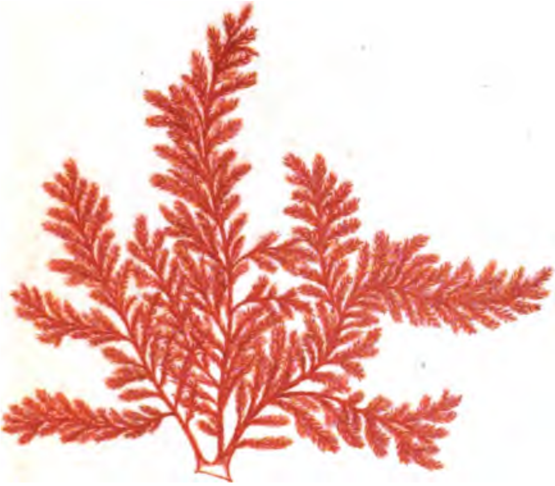


Calithamnion Turneri ?

Dec 1 [illegible] published by Jas Sowerby London

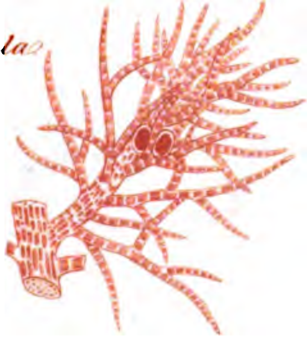
1916

2459



Calithamnion

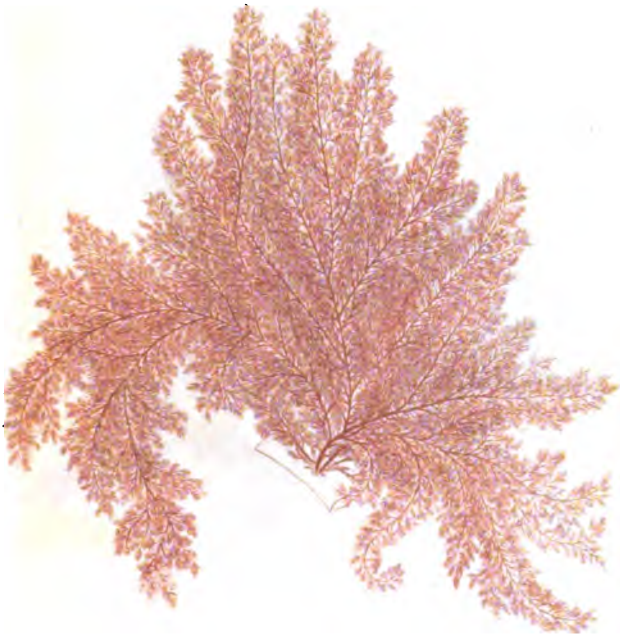
Arbuscula

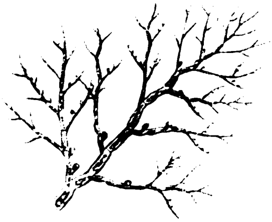


Aug 1 1808 Published by Ja.s Sowerby London.

966

2460



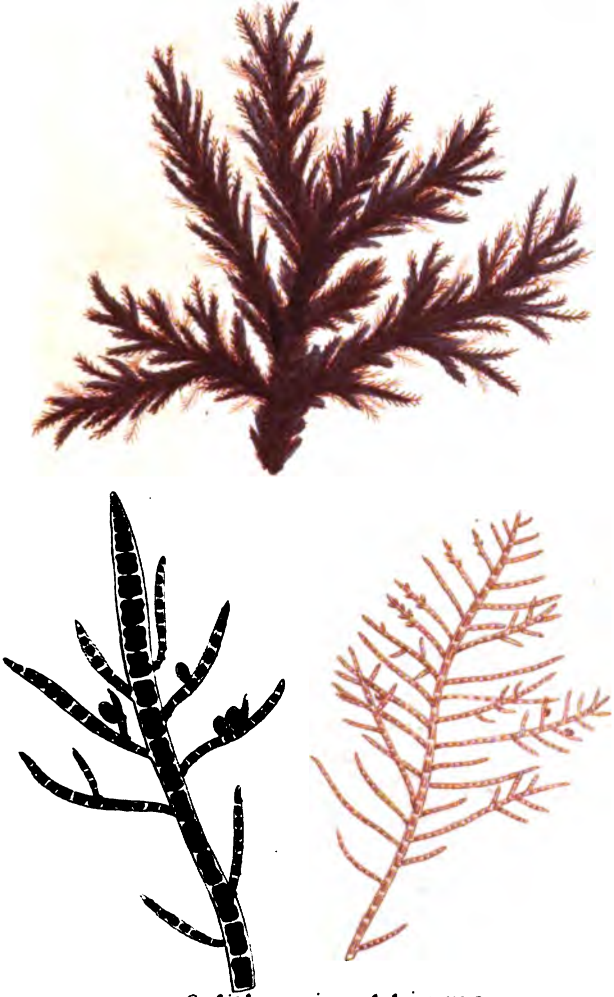


Calithamnion roseum?

Dec. 1. 1811. Published by Jas. Sowerby, London.

1915

2461.



Calithamnion tetricum?

Aug. 1 1808 Publish'd by Jas. Sowerby London.

CALITHAMNION ARBUSCULA. *Shrubby Calithamnion.* TAB. **2459.**

Frond erect; main stems inarticulate, naked below, thick, cartilaginous; main branches thickly clothed with minute imbricated plumules; ultimate pinnules alternate, divaricated, attenuate. Articulations as broad as long. Thecæ on the inner faces of the pinnules.

Conferva Arbuscula, *Dillwyn Conf. tab.* 85. *E. B.* 1916. Calithamnion Arbuscula, *Lyngbye Hydroph. Dan. tab.* 38. *fig.* 1, 2, 3. *Hooker Crypt. Part* 1. 340. Asperocaulon Arbuscula, *Grev. Crypt. Fl. Edin.* 307. Dasya Arbuscula et spongiosa, *Agardh Spec. Alg.* 2. 121.

Very common on the rocks on the western shores of Ireland and Scotland, but rare elsewhere. The plant forms a shrub-like tuft from three to six inches high, the main stem being often as thick as a small quill, destitute of branches at the lower part. Brownish-red or claret-colour. Thecæ dark red, spherical, sessile, axillary on the ultimate ramuli.

CALITHAMNION HOOKERI. *Hooker's Calithamnion.*

"Stem and branches thick, cartilaginous, inarticulate, laxly set with short, subovate pinnules; pinnæ flexuose, patent, subsimple, very slender, acuminated. Thecæ subsolitary, seated near the base of the lowermost pinnæ."

Conferva Hookeri, *Dillwyn Conf. tab.* 106. Calithamnion Hookeri, *Agardh Spec. Alg.* 2. 179. *Hooker Crypt. Part* 1. 341.

Very rare. Found at Cawsie, by Messrs. Hooker and Borrer, and at Holyhead, by the Rev. H. Davies.

CALITHAMNION ROSEUM. *Rosy Calithamnion.* TAB. **2460.**

Stem repeatedly branched; branches lax, plumulate, the plumules crowded towards the tops; pinnæ long, patent, subsimple and flexuose. Articulations much longer than broad. Thecæ elliptical, sessile about the bases of the pinnæ.

Conferva rosea, *E. B.* 966. Calithamnion roseum, *Agardh Spec. Alg.* 2. 164. *Hooker Crypt. Part* 1. 341. Ceramium roseum, *Roth Cat. Bot.*

Common, certainly so on the south-eastern shores of England, growing in dense tufts, two or three inches high, on *Fucus vesiculosus, serratus,* &c. Fronds repeatedly branched from the base; branches slender, elongated, flexuose, plumulate. Rose-colour, varying to purplish-red. Thecæ often numerous, elliptical, ranged on the upper sides of the branchlets and plumules toward their bases.

An exceedingly variable, but always beautiful and elegant species. See Tab. 2463, and corresponding description.

CALITHAMNION TETRICUM. *Rope-like Calithamnion.* TAB. **2461.**

Frond rigid, much-branched; branches hairy below, plumulate above; plumules crowded, subquadrifarious, pinnate; pinnæ acute, basally

attenuated, erecto-patent. Articulations twice or thrice as long as broad. Thecæ elliptical, on short, lateral processes of the pinnæ.

Conferva tetrica, *Dillwyn Conf. tab.* 81. *E. B.* 1915. Calithamnion tetricum, *Agardh Spec. Alg.* 2. 179. *Hooker Crypt. Part* 1. 342.

Frequent on the steep sides of rocks, more rarely attached to the stems of the larger *Fuci* and *Laminariæ*, forming "dense ropy tufts," two or three inches to nearly a foot in length, and of a dull, brownish-red colour. Articulations about twice as long as broad, longer in the older branches. Thecæ not quite sessile, elliptical or obovate, mostly solitary, sometimes two or three together, on the upper sides of the ultimate pinnulæ, minute.

A beautiful plant in the water, but difficult to preserve with effect; small specimens adhere to paper and dry with little alteration of colour.

CALITHAMNION TETRAGONUM. *Square-stalked Calithamnion.* TAB. **2462.**

Fronds tufted, repeatedly branched, cartilaginous. Branches square, patent, alternate, once or twice pinnate; plumules short, alternate, pinnate below, fasciculately multifid above, mucronate. Articulations nearly twice as long as broad. Thecæ lateral, sessile, subglobose.

Conferva tetragona, *Dillwyn Conf. tab.* 65. *E. B.* 1690. Calithamnion tetragonum, *Agardh Spec. Alg.* 2. 176. *Hooker Crypt. Part* 1. 343.

Frequent on the southern and south-western shores of England and Ireland, always epiphytic on the larger species of *Fucus* and *Laminaria*. The fronds grow in tufts to the height of two or three inches, and are repeatedly branched in an alternate manner, the branches spreading and mostly two or three times pinnate, the ultimate ones bluntly subulate, but terminating in a small point. Articulations about twice as long as they are broad in the stem and main branches, but successively shorter in the smaller ramifications. Thecæ very minute, subglobose, sessile on the upper side of the ultimate ramuli.

The stems and principal branches of this pretty and, on our southern coasts especially, common species, are tetragonal, with the sides more or less sulcated in the recent state, and with the joints contracted. It adheres to paper in drying, but not very firmly, and the beautiful rose-colour or pink is very fugitive.

CALITHAMNION PURPURASCENS. *Purplish Calithamnion.* TAB. **2463.**

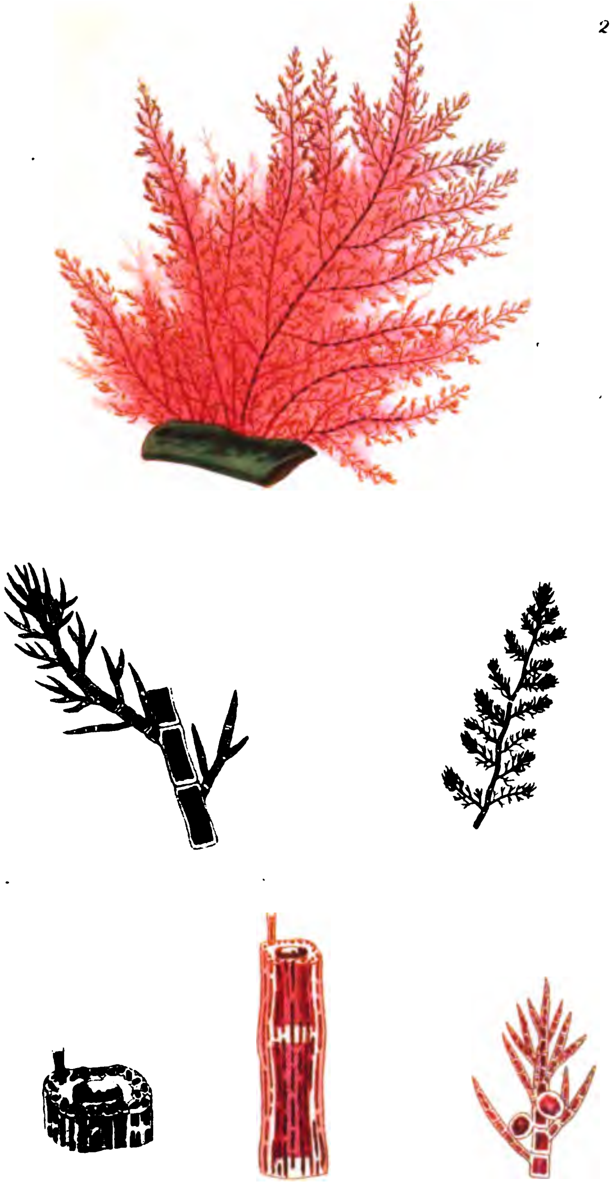
Fronds tufted, repeatedly branched, very slender. Articulations slightly tumid, thrice as long as broad, with pellucid partitions; those of the main stems compound. Thecæ lateral, obovate, sessile.

Conferva purpurascens, *Smith. E. B.* 2465. Calithamnion purpurascens, *Hooker Crypt. Part* 1. 343.

"Gathered on the beach at Brighton, by Mr. W. Borrer, who thinks

1690

2462

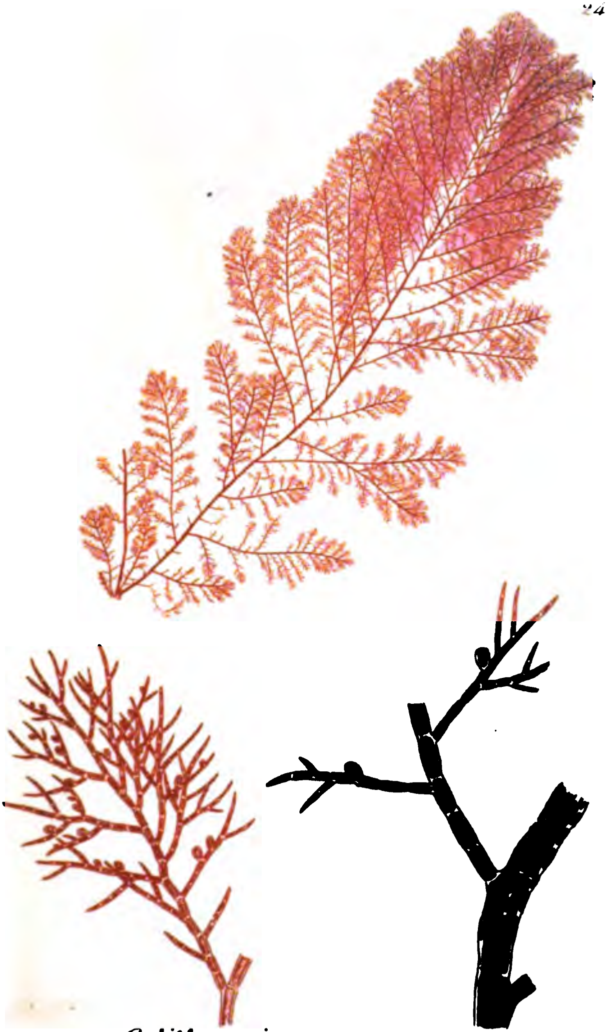


Calithamnion tetragonum?

Jan 1. 1807 Publish'd by Jas Sowerby, London

2465.

2463



Calithamnion purpurascens.

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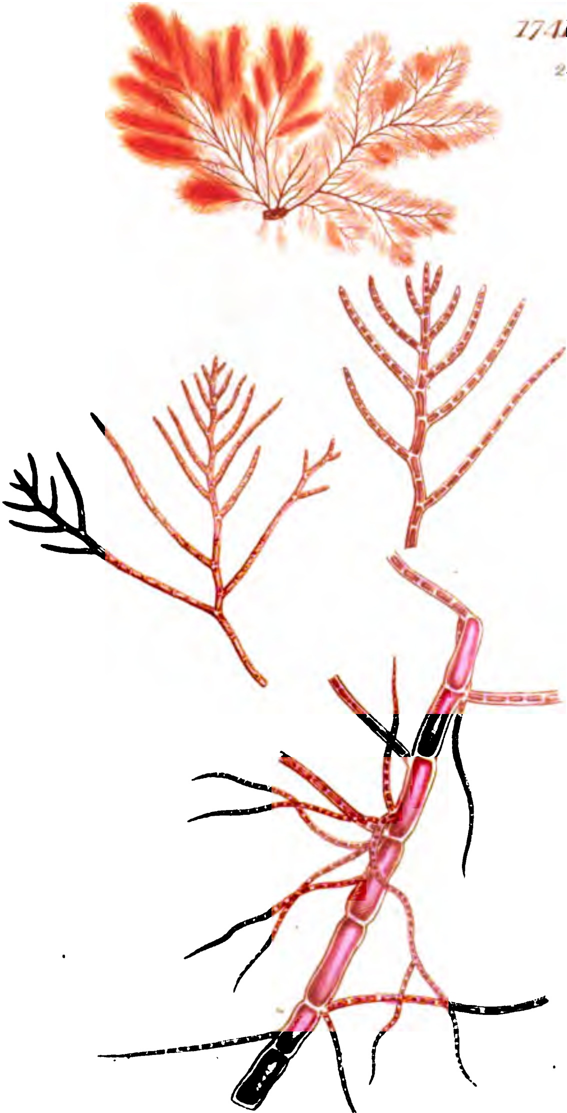
1741

2464.

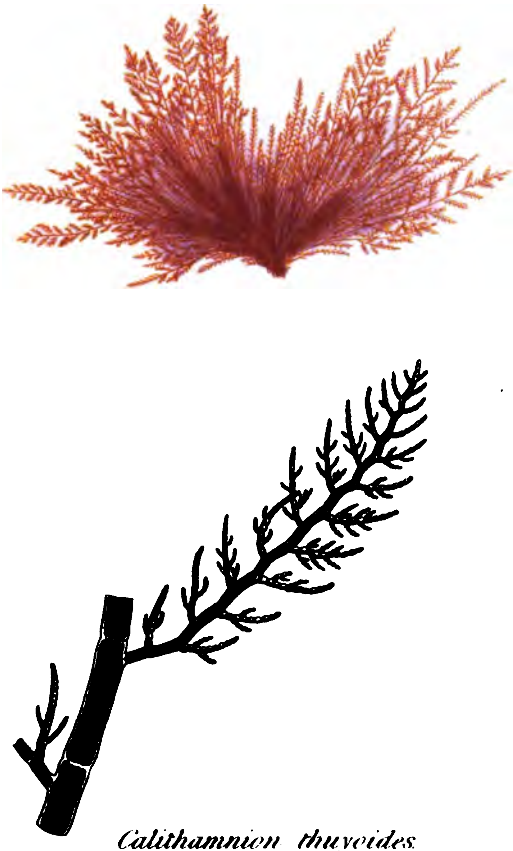


Calithamnion Borreri?

May 1807. Publish'd by Jas Sowerby, London.

2465

2465.



Calithamnion thuyoides.

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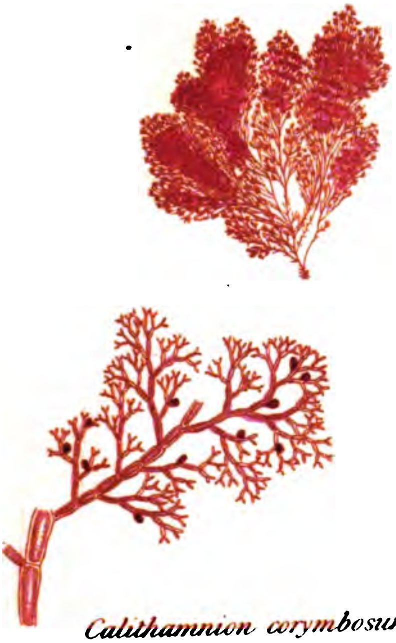
2352.

2466



Calithamnion corymbosum?

Nov 1 1811 published by Jas. Sowerby London

it may be *C. purpurascens* of Hudson, a species hitherto involved in some doubt, and thought by Mr. Dillwyn the same as our *C. rosea*, Tab. 2460. Mr. Borrer observes that the stem and principal branches are veined, or composed of several contorted tubes, each of which is jointed individually, the general dissepiments in those parts being very obscure. In other respects, except a rather more tufted habit, and a greenish or brownish hue, it agrees with *C. rosea*."—*Smith*.

"Mr. Borrer suspects it may be only a larger specimen of *C. roseum*." —*Hooker*. It does not appear to have been noticed by any botanist since the publication of the above, and the specimen figured is not in the Eng. Bot. herbarium. Its resemblance to *C. roseum* is very close, nor, though retaining the plate in the present edition on account of the very characteristic figure, do I believe it distinct.

CALITHAMNION Borreri. *Borrer's Calithamnion.* Tab. **2464**.

Frond slender, repeatedly branched, membranaceous: plumules flabelliform, naked below, pinnate above; pinnæ simple, recurvo-patent, the lower ones the longest. Articulations of the branches four or five times, those of the pinnæ twice or thrice as long as broad, contracted at the joints.

Conferva Borreri, *Smith E. B.* 1741. *Dillwyn Conf. Syn.* 79. Calithamnion Borreri, *Agardh Spec. Alg.* 2. 170. *Hooker Crypt. Part* 1. 344.

Very rare. First found by Mr. Borrer, at Yarmouth, in October 1806. About two inches high, forming small tufts of a delicate pink colour, turning to orange in fresh water. Its fronds are extremely slender, much and repeatedly branched, the branches somewhat zigzag, spreading in two ranks, the ultimate ones plumose. Articulations slightly swollen towards each extremity; the joints contracted. Fructification unknown.

Substance very flaccid, almost membranaceous.

CALITHAMNION thujoides. *Arbor-vitæ-like Calithamnion.* Tab. **2465**.

Fronds tufted, very slender, irregularly branched; plumules linear-lanceolate, bipinnate. Articulations of the branches four or five times, those of the pinnæ twice or thrice as long as broad. Thecæ terminal.

Conferva thujoides, *Smith E. B.* 2205. Calithamnion thujoides, *Agardh Spec. Alg.* 2. 172. *Hooker Crypt. Part* 1. 346.

Almost as rare as the preceding, being only occasionally met with on the southern and eastern coasts of England. A beautiful species, from one to three inches high, very flaccid and slender, alternately branched. Main branches somewhat zigzag, set at regular distances on each side with short, alternate, equal, pinnate ramuli. Rose-coloured. Adheres to paper in drying. Our specimens are without fructification of any kind, but the thecæ are described as terminal.

CALITHAMNION corymbosum. *Corymbose Calithamnion.* Tab. **2466**.

Fronds tufted, slender, repeatedly branched, subgelatinous; secondary branches alternate, dichotomous, level-topped; ultimate ones acute, dichotomous, appressed. Articulations very much longer than broad. Thecæ elliptical, solitary, axillary, minute.

Conferva corymbosa, *E. B.* 2352. Calithamnion corymbosum, *Agardh Spec. Alg.* 2. 165. *Hooker Crypt. Part* 1. 346.

Rare; chiefly met with on the southern shores of England and Ireland. Fronds bright rose-colour, very flaccid, almost gelatinous, one to three inches high, repeatedly branched, and dichotomous throughout, corymbiform. Articulations variable, but always very long, those of the main branches often eight or ten times longer than they are broad, slightly swelling upwards. Thecæ nearly sessile, trisporous, sometimes apparently lateral, owing to the non-development of the ultimate ramuli.

CALITHAMNION INTERRUPTUM. *Interrupted Calithamnion.* TAB. 2467.

Frond much-branched, dichotomous, slender. Articulations four times as long as broad, slightly swelling upwards. Thecæ on short, lateral stalks, elliptical, with a transverse separation.

Conferva interrupta, *Smith E. B.* 1838. Calithamnion interruptum, *Agardh Spec. Alg.* 2. 174. *Hooker Crypt. Part* 1. 347.

Found at Brighton by Mr. Borrer, and at Weymouth by the Rev. M. J. Berkeley. Fronds dull brownish rose-colour, about an inch high, very much branched. The elliptical thecæ grow on short, lateral, solitary stalks, at the summits of the joints, on the outer side, and are remarkable for being, when ripe, distinctly divided by a transverse partition into two cells.

Perhaps not distinct from the next species, which it seems to resemble in almost every particular, the remarkably divided thecæ excepted; the latter, however, is probably only an accidental character, resulting from the enlargement of the endochrome of two terminal cellules instead of one. No dependence can be placed on the smaller size and more obtuse terminations of the branches, *C. pedicellatum* being one of the most variable species of the genus.

CALITHAMNION PEDICELLATUM. *Stalk-fruited Calithamnion.* TAB. 2468.

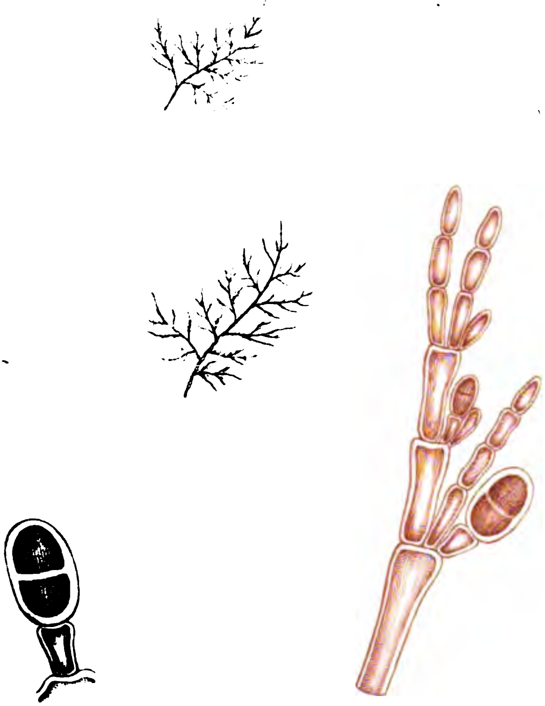
Frond tufted, branched; branches capillary, beset with short, alternate, sparingly dichotomous ramuli; apices more or less obtuse. Articulations elongated, slightly swelling upwards. Thecæ elliptical, axillary, pedicellate.

Conferva pedicellata, *Smith E. B.* 1817. *Dillwyn Conf. tab.* 108. Calithamnion pedicellatum, *Agardh Spec. Alg.* 2. 174. *Hooker Crypt. Part* 1. 347.

Not unfrequent on the southern coasts of England and Ireland. Fronds from two to six inches high, red or rose-colour, forming thick, straight tufts. Main branches very slender, few, and little divided, except that they are beset with more or less crowded, dichotomous, hair-like ramuli. Articulations always very long, in the smaller branches cylindrical, in the larger ones swelling a little towards the

1838

2467

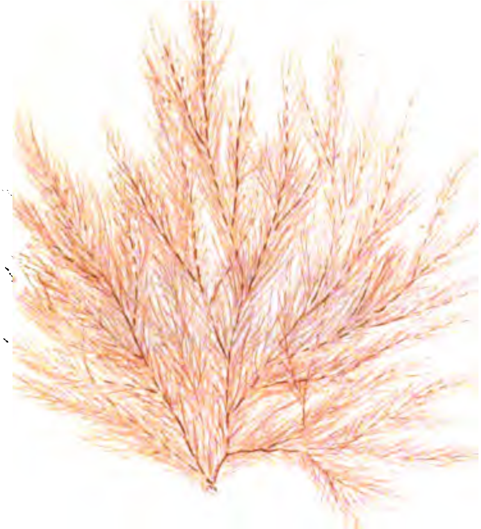


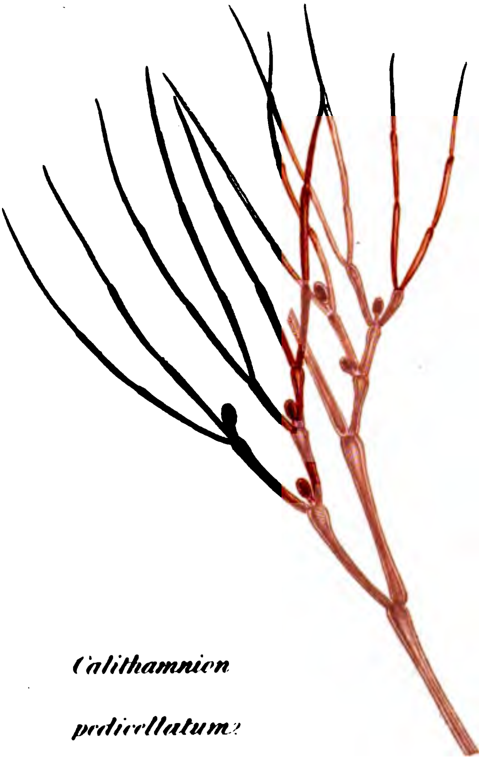
Calithamnion interruptum ?

Jan. 1. 1808. Publish'd by Ja.s Sowerby, London.

1817

2468.





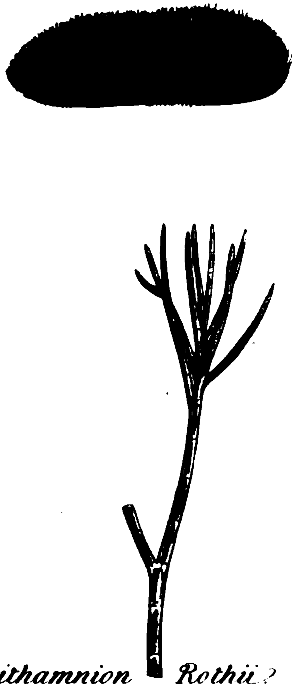
Calithamnion

pedicellatum?

Nov 1 1809. Publish'd by Jas Sowerby London

1702

2469.

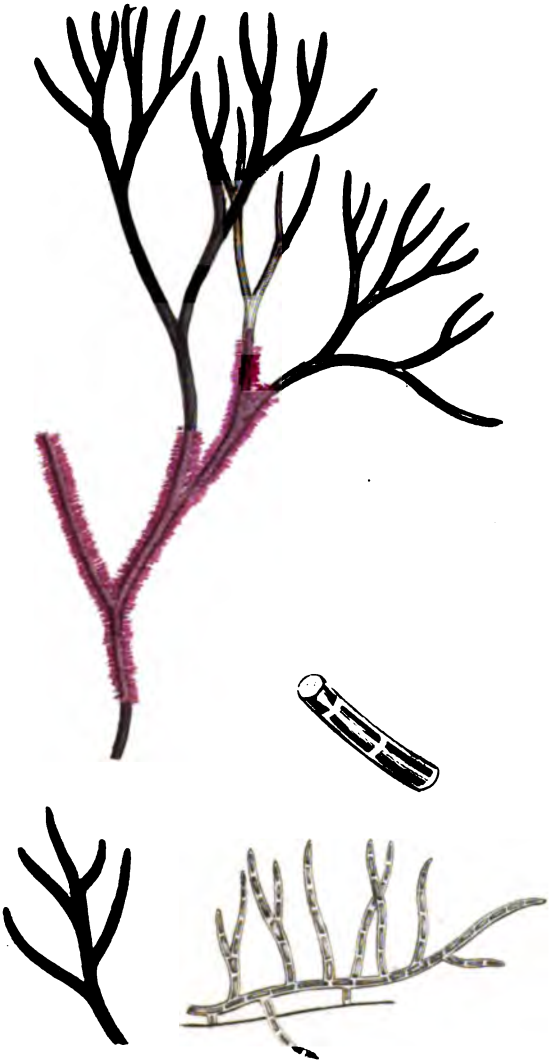


Calithamnion Rothii?

Feb. 1. 1807. Publish'd by Jas. Sowerby London.

1608

2470.



Calithamnion repens.

June 1. 1806. Publiſhed by Jaſ. Sowerby, London

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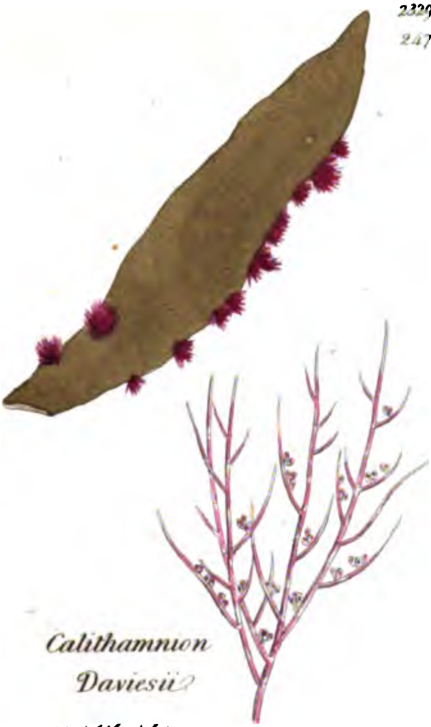
2471.



Calithamnion Daviesii

[illegible] published by Jas. Sowerby London

apex. Thecæ dark brown, elliptical, or pyriform, solitary, standing on a short stalk; generally in the acute bifurcations of the upper ramuli.

A very variable plant. In drying the fine rose-red colour changes to a dull brownish hue. It resembles *Griffithsia setacea* in giving out its colouring matter in fresh water.

CALITHAMNION Rothii. *Roth's Calithamnion.* Tab. **2469.**

Fronds erect, very short, closely tufted, much-branched; branches alternate, the upper ones crowded. Articulations twice as long as broad.

Conferva Rothii, *Turton. Dillwyn Conf. tab.* 73. *E. B.* 1702. Calithamnion Rothii, *Lyngbye Hydroph. Dan.* 129. *tab.* 41. *Agardh Spec. Alg.* 2. 185. *Hooker Crypt. Part* 1. 347.

Common on most rocky shores, growing about high-water mark. The fronds form large velvety patches of a bright red or purple colour, from a quarter of an inch to an inch in height; the filaments are very slender, crowded, divided below into distant, alternate branches, and above into crowded, somewhat appressed ones, all terminating acutely. "Thecæ elliptical, minute, borne in clusters on short, spreading, corymbose ramuli, situated near the apices of the branches."—*Carmichael in Hooker.*

Growing in deeper water, it attains a larger size, with longer articulations, and is then *Conferva florida* of Dillwyn Conf. Supp. tab. F., *Calithamnion floridulum* of Agardh.

CALITHAMNION repens. *Creeping Calithamnion.* Tab. **2470.**

Filaments creeping. Stems erect, crowded, capillary, branched; branches alternate, patent, simple or with a few short ramuli. Articulations variable, longer than broad. Thecæ globose, on long footstalks.

Conferva repens, *Dillwyn Conf. tab.* 18. *E. B.* 1608. Calithamnion repens, *Lyngbye Hydroph. Dan.* 128. *tab.* 40. *Agardh Spec. Alg.* 2. 184. *Hooker Crypt. Part* 1. 348.

A very common epiphyte, or parasite, growing on many of the marine Algæ, especially in their sickly state, but most frequent on the rounded stems and branches of *Furcellaria fastigiata* and *Polyides rotundus.* The fronds creep and fix themselves to the surface of the supporting plant, over which their numerous erect, stem-like branches form a dense woolly or velvety coating of a deep red colour, very short at first, but in their ultimate growth often an inch or more in height. Articulations from two to five times as long as they are broad. Our figure represents the plant in its young state, when of course the fructification is wanting; the thecæ, however, are not unfrequent, supported on long, sometimes branched pedicels.

Conferva tenella, Dillwyn Conf. Supp. tab. F., belongs to this species.

CALITHAMNION Daviesii. *Davies' Calithamnion.* Tab. **2471.**

Fronds minute, tufted, much-branched: branches distant, scattered, with diaphanous, taper points, bearing a few suberect ramuli.

Articulations elongated, full thrice as long as broad. Thecæ lateral, clustered, obovate.

Conferva Daviesii, *Dillwyn Conf. Syn.* 75. *tab. F.* *E. B.* 2329. Calithamnion Daviesii, *Agardh. Hooker Crypt. Part* 1. 348.

Not unfrequent, at least on the southern shores of England, but probably often overlooked on account of its minuteness. It is an epiphytic, or perhaps parasitic species, being found like the preceding on many of the larger Algæ, and especially on those that are in an unhealthy state. The fronds form little compact tufts of a deep crimson colour, varying sometimes to a pale pink, seldom more than a quarter of an inch high, and indeed generally much smaller; they are much-branched, irregularly and distantly, and the length of the articulations varies considerably, but exceeds the breadth at least three times, the joints being slightly contracted. The fructification is copiously arranged along the upper sides of the ultimate branchlets, in nearly sessile groups of two or three minute, obovate thecæ, each containing a mass of crimson sporules, sometimes divided into two by a dissepiment, as in *C. interruptum.*

CALITHAMNION LANUGINOSUM. *Downy Calithamnion.*

Fronds nearly simple, very minute, brownish; ramuli short, obtuse, secund. Articulations thrice as long as broad, pellucid in the centre.

Conferva lanuginosa, *Dillwyn Conf. tab.* 45. Calithamnion lanuginosum, *Lyngbye Hydroph. Dan.* 130. *tab.* 41. *Hooker Crypt. Part* 1. 349. C. pubescens, *Agardh Spec. Alg.* 2. 187.

A very common species, parasitical on *Ceramium rubrum* and other Algæ in an incipient state of decay.

For various other species, or supposed species of this genus, met with on our shores, see Hooker Crypt. Part 1. 339—349 inclusive.

The species of *Calithamnion* are liable to such apparently endless variation, that it is very difficult, if not impossible, to decide their respective limits. On this account, and to avoid the extension of our letter-press beyond the plan of the preceding volumes, those plants only are described which are figured in the "English Botany," or of which authentic specimens are in the possession of the editor. A similar course will be pursued in reference to the remaining genera and species of this vast natural series, including, as they do, the lowest and least observable forms of vegetable existence, whose distinguishing characters are often too simple and too equivocal to be realized in description.

TRIBE XVI. CONFERVEÆ.

Marine or freshwater plants, generally of a green colour, very rarely pink or brown. Fructification, a granular, coloured, internal mass, which affects various forms.

The genus *Bulbochæte* is an exception, being furnished with thecæ.

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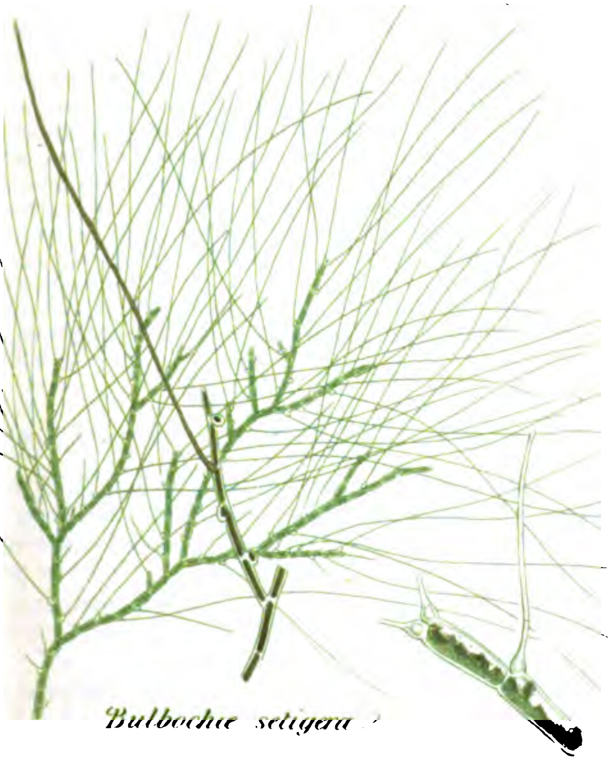
2472



Bulbochæte setigera

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GENUS DCLXX. BULBOCHÆTE. *Bulbochæte.*

GEN. CHAR. *Fronds* filamentous, articulated, branched: each articulation bearing at its truncated apex, either an elongated, inarticulate, deciduous seta, or a sessile, spherical theca; base of the seta scutate, amplexicaul.

A single species, resembling a *Conferva* in habit, colour, and general structure, but differing from that genus in the production of distinct, lateral thecæ, is segregated by Agardh under this type, and named from *βολβὸς, a bulb*, and *χαίτη, a bristle*, in allusion to the tumid bases of the long setaceous ramuli.

BULBOCHÆTE SETIGERA. *Setigerous Bulbochæte.* TAB. **2472.**

Conferva vivipara, *Dillwyn Conf. tab.* 59. *E. B.* 2086. C. setigera, *Roth Cat. Bot. fasc.* 3. 283. *tab.* 8. *fig.* 1. Bulbochæte setigera, *Agardh Syst. Alg.* 123. *Hooker Crypt. Part* 1. 350.

Not unfrequent in slow rivers, pools, and lakes, growing on aquatic plants, in the form of dense continuous masses of a light, pellucid green colour. Main filaments from a quarter to half an inch high, much-branched alternately, zigzag. Articulations rather enlarging upward, and four or five times as long as broad: bearing at the joints, on one side, a very long, extremely slender, simple, hair-like branch, with a tumid, glandular or bulbous base; or otherwise an ovate or subspherical theca.

The setaceous ramuli are deciduous, but not their tumid bases, which are apparently vesicles, that enlarging, some of them at least, form the thecæ.

GENUS DCLXXI. CONFERVA. *Conferva.*

GEN. CHAR. *Filaments* distinct, simple or branched, articulated, uniform. *Sporules*; the enlarged granules of the endochrome, dispersed by the rupture or decay of the including vesicles.

This extensive genus, as at present constituted, is of very uncertain limit, and the species in many instances are very ill-defined. They present considerable difference in habit, some growing attached and others floating loosely in the water; but so simple is their structure that specific distinctions are often involved in much obscurity, and however desirable it may be that a series of plants, undoubtedly numerous, and occupying habitats so varied as do the *Confervæ*, should be more satisfactorily and definitely arranged, no one has hitherto been found willing to undertake so difficult a task. It is really rather a group than a genus, but extensive microscopical research, and that perhaps with more powerful instruments than any we yet possess, alone can elicit the structural characters on which generic distinctions ought justly to be founded.

The hue of the *Confervæ* is almost universally green, in a few instances varying to a brownish orange-colour or purplish: they are met with in freshwater pools, ditches, and rivers, as well as in the sea, but almost all of the species belong to cold or temperate climates, where, in the summer months especially, scarcely any water exposed to the air and sun is without them; the freshwater species of these, indeed, are among the most important of the Algæ, as regards their agency in ameliorating the unwholesome character of that element in its stagnant state. Many of them contribute very largely, by their annual growth and decay, to the filling up of the pools in which they vegetate, and converting them, with the after-assistance of mosses and other plants of higher organization, into marshes.

The name *Conferva* was bestowed by the Romans on some plant of the family, used by them as a dressing to fractured bones, from *conferruminare*, *to unite* or *consolidate*, a property which it was supposed to possess.

* *Filaments simple.*

† *Growing in fresh water.*

CONFERVA ERICETORUM. *Purplish Heath Conferva.* TAB. **2473.**

Filaments simple, very slender, entangled, forming a thin purplish stratum. Articulations about as long as broad.

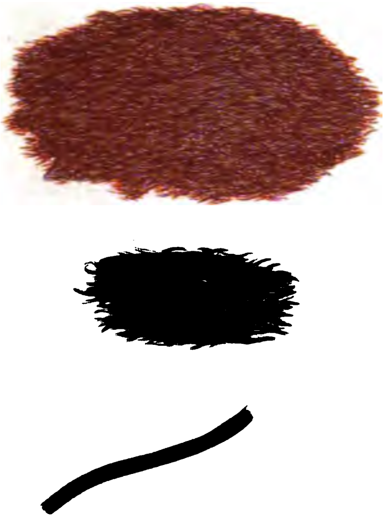
Conferva ericetorum, *Roth. Dillwyn Conf. tab.* 1. *E. B.* 1553. *Hooker Crypt. Part* 1. 350.

Sometimes very abundant, and indeed not uncommon, on moist sandy heaths, growing in large patches, readily distinguished by their dull purple colour, composed of numerous prostrate, simple filaments closely entangled, the articulations of which are about as long as broad, or very little longer, unless when the plant vegetates in the water, in which case their length is greater.

Sir W. J. Hooker describes the endochrome as filling the vesicles and "finally bipartite," and mentions the plant as abundant on *dry* heaths; but the character of the endochrome is by no means constant; it certainly contracts by age, but more frequently into a single mass occupying the centre of the vesicle. I have often observed it covering spaces which in the summer are dried up, but always where water lies in the winter and in wet weather, the plant, whether wet or dry, presenting much the same appearance, unless actually growing floating in the water; in which case it is the var. β. *aquatica* of Agardh, and perhaps *C. purpurascens* of the former author's Cryptogamia; indeed there are intermediate states between them, if the

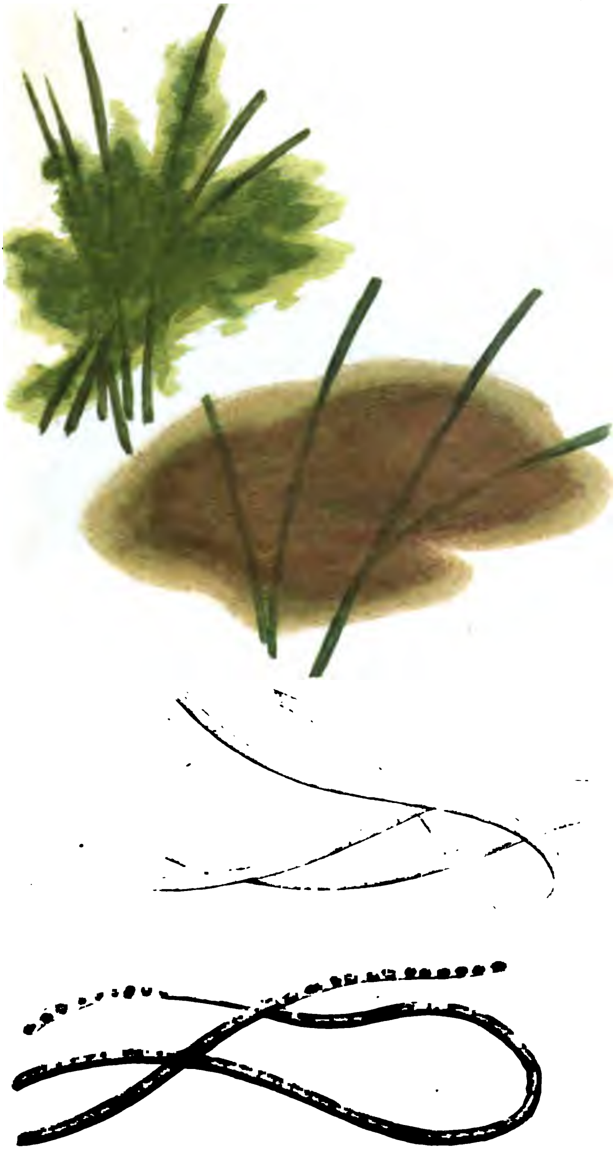
1553

2473.



Conferva ericetorum.

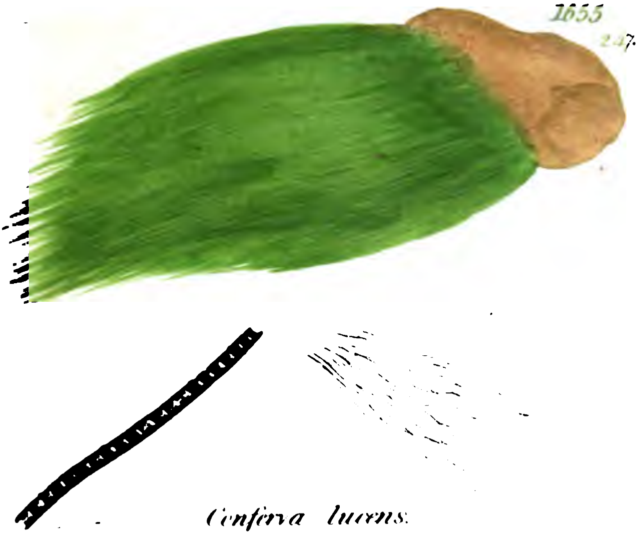
Jan.y 1 1806. Published by Jas. Sowerby, London.



Conferva floccosa

1655

2475



Conferva lucens.

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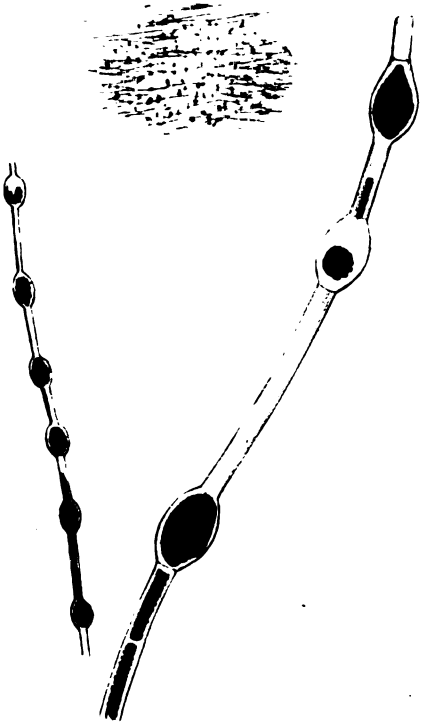
1670

2476.



Conferva vesicata?

Nov 1.1806 Publish'd by Ja.s Sowerby, London

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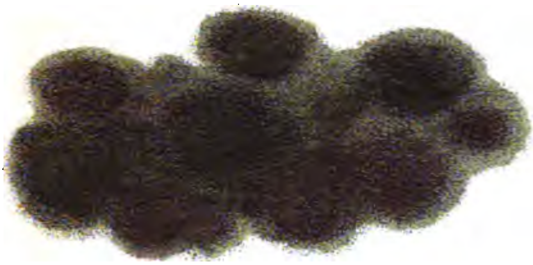
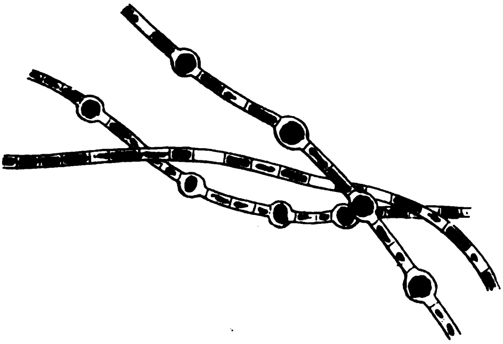
2477.





Conferva alternata.

July 1 [illegible] published by Jas. Sowerby London

specific character given in that work of the latter plant include its only distinctions.

CONFERVA BOMBYCINA. *Silky Conferva.* TAB. **2474.**

Filaments simple, very slender, flaccid, entangled, forming pale green or olive-coloured, floating strata. Articulations longer than broad.

Conferva sordida, *Roth. Dillwyn Conf. tab.* 60. *E. B.* 2303. C. bombycina, *Agardh Syst. Alg.* 88. *Hooker Crypt. Part* 1. 350.

Common in stagnant water, generally adhering in the form of pale or olive-green, cloud-like masses about the stems and submersed leaves of aquatic plants. Filaments very slender, but of varying thickness; their articulations always longer than broad, but differing in proportion to the fineness of the filaments, the most slender having them often three or four times longer. In hot weather the masses become disengaged, and rise to the surface, like those of some other species, and by exposure become of a dirty yellowish or olive hue, forming *C. fugacissima* of Roth and Dillwyn, *C. floccosa* of Agardh.

Our figures of this *Conferva* are not very characteristic, especially in the magnified portion, which does not sufficiently express the articulations,—a deficiency not observed until after publication. That the two supposed species are only varieties of the same, notwithstanding the difference in the size of the filaments and length of the articulations, long and careful observation has satisfied me; they are almost universally to be detected entwined in the same mass, and pass through similar gradations of development and colour.

I have preferred adopting the name *bombycina* to either of the others, on account of the silky texture of the dried plant. It adheres pretty firmly to paper.

CONFERVA LUCENS. *Shining River Conferva. Banded Conferva.* TAB. **2475.**

Filaments simple, lubricous, bright green, shining. Articulations about as broad as long, marked in the centre with a green band.

Conferva lucens, *Dillwyn Conf. tab.* 47. *E. B.* 1655. C. zonata, *Agardh Syst. Alg.* 90. *Hooker Crypt. Part* 1. 351.

Found, attached to stones, in clear, rapid streams and rivulets, and not unfrequent in rocky and subalpine districts. Filaments two or three inches long, taper-pointed, very slender, about the 700th of an inch in diameter, forming dense tufts which yield to the stream, of a bright glossy green colour. Articulations generally rather longer than broad, but sometimes the contrary, pellucid at the extremities, the green colouring matter being condensed in the middle, like a little band.

CONFERVA VESICATA. *Inflated Conferva.* TAB. **2476** & **2477.**

Filaments simple, very slender, forming dull green strata. Articulations two to five times longer than broad, here and there inflated.

Conferva tumidula, *E. B.* 1670. C. vesicata, *Agardh Syst. Alg.* 93. *Hooker Crypt. Part* 1. 351.

Common in stagnant pools and ditches, where it forms dull green or brownish floating strata. Filaments several inches in length, variously intertwined, exceedingly slender; their articulations very variable in their comparative length and breadth, as well as in the colour of the endochrome, which is often alternately green and brown in those of the same filament, giving it a variegated appearance. Here and there, and frequently at regular intervals, the endochrome enlarges, swelling out the vesicle which contains it into an oval or globular form, two or three times the diameter of the others, from which it occasionally disappears altogether, leaving the vesicles perfectly pellucid.

The diversity in the length of the articulations, and in the colour and enlargement of the endochrome, has occasioned this species to be separated into several by the earlier observers of its remarkable habit; one of these, *C. alternata*, Dillwyn Conf. Syn. tab. B, E. B. 2304, is figured in TAB. **2477**, and four of Agardh's species, viz. *C. vesicata, tumidula, Candollii,* and *Borisii*, are with justice referred by Sir W. J. Hooker to the one before us. A very doubtful member of the genus.

CONFERVA RIVULARIS. *Long River Conferva. Crow Silk.* TAB. **2478.**

Filaments simple, very long, slender, bright green, silky, forming straight tufted bundles. Articulations two or three times longer than broad.

Conferva rivularis, *Linn. Dillwyn Conf. tab.* 39, *E. B.* 1654. *Agardh Syst. Alg.* 95. *Hooker Crypt. Part* 1. 351.

Very common in rivers and slow streams, its straight tufts of filaments extending to the length of two or three feet or more, and undulating with the current. Articulations exceedingly variable in length, sometimes not more than half as long again as broad, more frequently several times longer; the joints not very conspicuous in the recent state, more so when dry, the original green colour fading to a pale and often whitish hue.

One of the most common and conspicuous of the freshwater Confervæ, and readily distinguished at first sight by the great length of the filaments.

CONFERVA DISSILIENS. *Brittle-jointed Conferva.* TAB. **2479.**

Filaments simple, straight, very fragile, slimy, forming bright green, floating masses. Articulations half as long as broad.

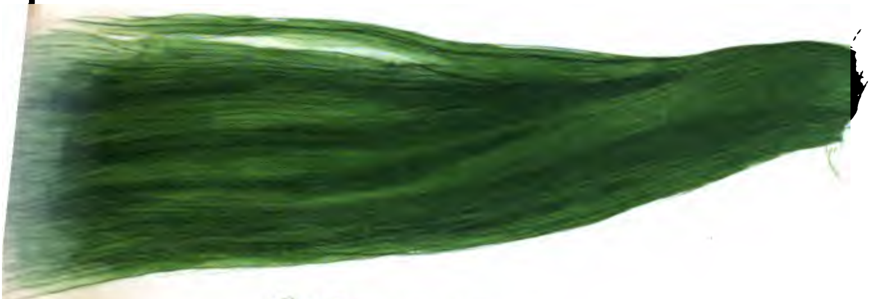
Conferva dissiliens, *Dillwyn Conf. tab.* 63. *E. B.* 2464? *Agardh Syst. Alg.* 90. *Hooker Crypt. Part* 1. 352.

The simple slender filaments form loose, floating masses, of a bright green colour, in ditches and slow streams, and the species is, perhaps, "not at all unfrequent," but I have much doubt of its belonging to the present genus.

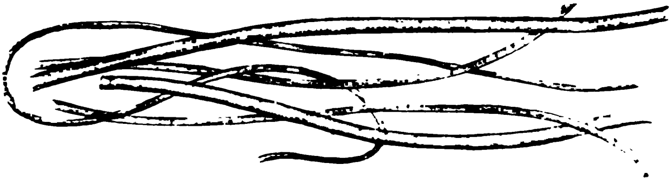
The English Botany figure is disclaimed by some of the best authorities on the Algæ, and, though republished under the original title, it is too obscure to be defended, while the original description

1654

2475



Conferva rivularis.



Oct 1 1806 Published by Jas Sowerby London.

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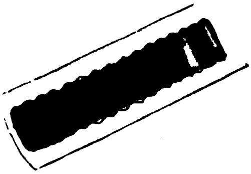

Conferva diſsiliens

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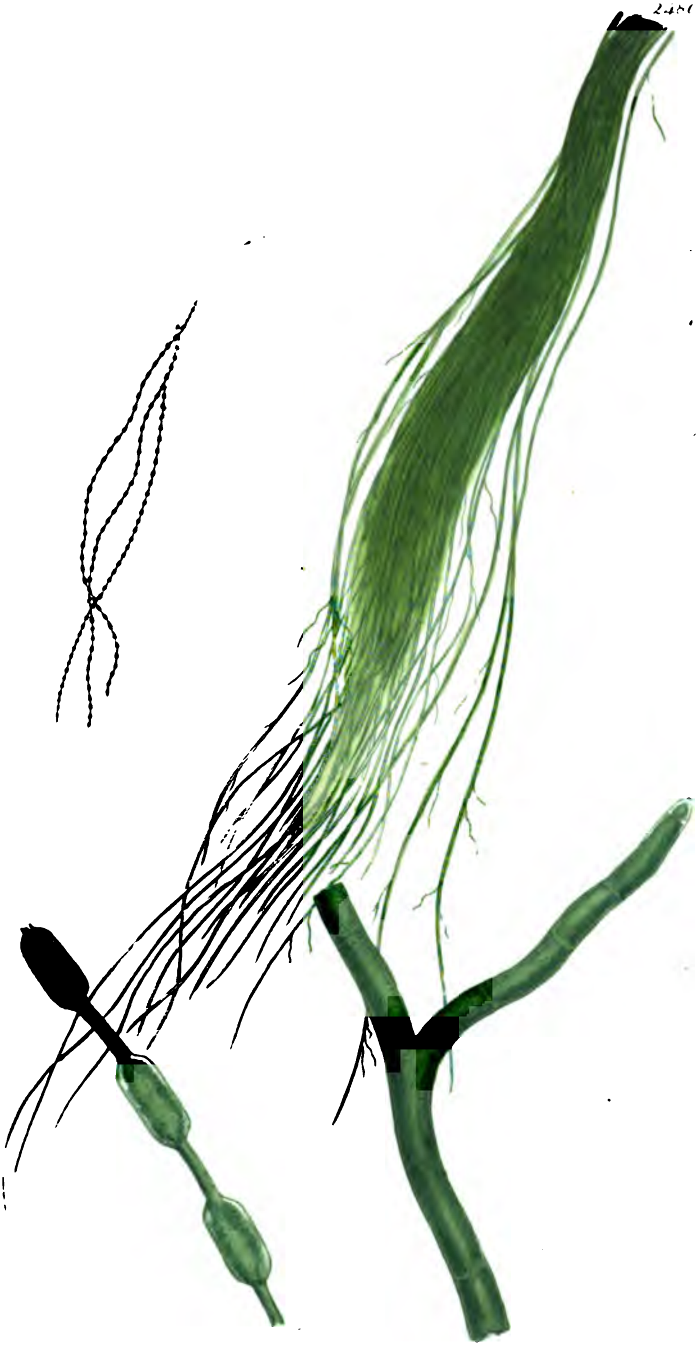

Conferva capillaris.

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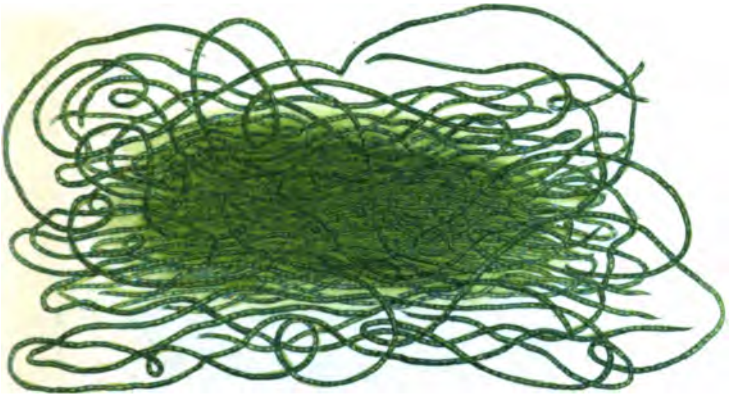

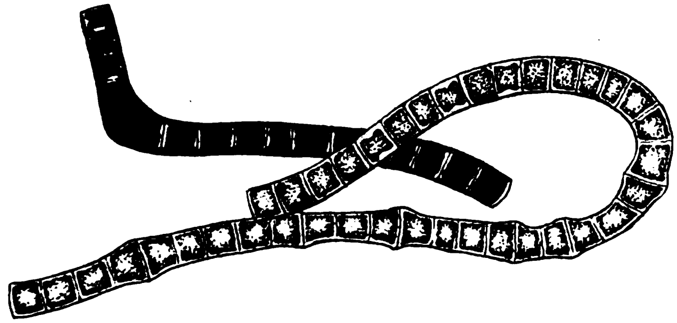

Conferva crassa?

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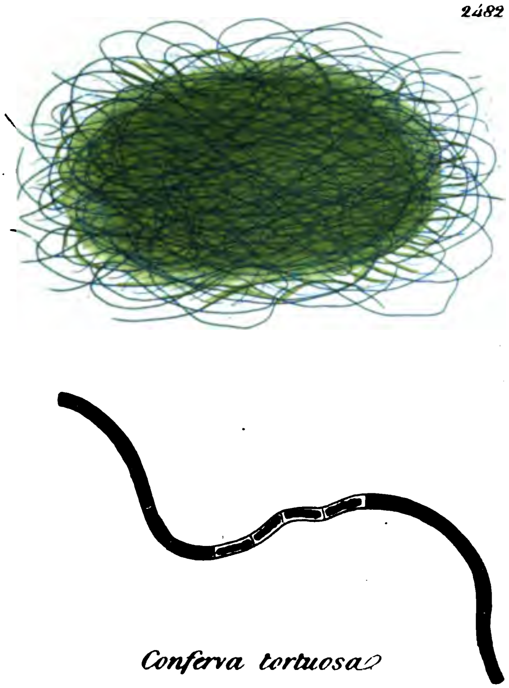
2482



Conferva tortuosa.

[illegible] published by Jas. Sowerby London

is certainly not that of a *Conferva*; the following character is likewise opposed to the habit of the normal species of the genus: "Articulations marked with a green band, *often separating and adhering at the angles.*"—Hooker.

CONFERVA capillaris. *Capillary Conferva.* Tab. **2480.**

Filaments nearly simple, very long, much entangled and interwoven into rather rigid, pale green, extensive strata. Articulations two to four times as long as broad; alternately compressed when dry.

Conferva capillaris, *Linn.* *E. B.* 2364. *Hooker Crypt. Part* 1.352. C. crispa, *Dillwyn Conf. Syn.* 46. *tab. B.* Prolifera crispa, *Vaucher Conf.* 130. *tab.* 14. *fig.* 2.

Not unfrequent in streams and rivulets, forming extensive strata, several feet in diameter. Filaments very much elongated, dull green, variously curled and interwoven, generally finer than human hair, but varying in thickness, simple, with the exception of short, lateral branches, protruded here and there, especially towards the extremity. Articulations much longer than they are broad, becoming flat in drying, and, almost constantly, alternately compressed at right angles. The plant is not at all lubricous, and scarcely adheres to paper.

†† *Growing in the sea or in salt-water pools or ditches.*

CONFERVA crassa. *Thick Conferva.* Tab. **2481.**

Filaments simple, very long, thick, rigid, much curled and entangled into large, loose, harsh masses. Articulations about as broad as long.

Conferva Linum, *E. B.* 2363. C. crassa, *Agardh Syst. Alg.* 99. *Hooker Crypt. Part* 1.352. C. capillaris, *Dillwyn Conf. tab.* 9.

Not uncommon in stagnant salt water, especially on the eastern and southern coasts of England. Filaments several feet long, as thick as coarse sewing-thread, coiled and entangled together, so as to form a loose, rigid mass; very fragile while recent, but soon becoming flaccid when taken out of the water.

It does not adhere to paper.

CONFERVA tortuosa. *Twisted Conferva.* Tab. **2482.**

Filaments simple, rigid, slender, much curled and twisted, forming broad, closely entangled strata. Articulations twice or thrice as long as broad.

Conferva tortuosa, *Dillwyn' Conf. tab.* 46. *E. B.* 2220. *Agardh Syst. Alg.* 98. *Hooker Crypt. Part* 1.352.

Frequent in salt-water pools and ditches, and on rocks in the sea. The filaments, finer than human hair, grow in entangled, elastic masses, and are of a deep green colour, and remarkably curled and undulated. Articulations variable in length, but never less than two or three times their diameter: in drying the joints become pellucid, and the endochrome shrinks into the middle of the vesicle.

CONFERVA IMPLEXA. *Interwoven Conferva.* TAB. 2483.

Filaments simple, rather flaccid, capillary, forming extensive, interwoven, bright green strata. Articulations nearly twice as long as broad.

Conferva implexa, *Dillwyn Syn.* 46. *tab. B.* *E. B.* 2309. *Agardh Syst. Alg.* 91. *Hooker Crypt. Part* 1. 352.

Found on marine rocks in various places, forming densely entangled strata, of a bright, but darkish green colour, and soft, somewhat silky, to the touch. Filaments twisted, curled and implicated in every direction, so as to resemble in the mass, when dry, a kind of felt; not more than half the diameter of those of *C. tortuosa*, and with shorter articulations.

CONFERVA ÆREA. *Harsh Verdigris Conferva.* TAB. 2484.

Filaments simple, straight, somewhat rigid, yellowish-green, tufted. Articulations about as long as broad.

Conferva ærea, *Dillwyn Conf. tab.* 80. *E. B.* 1929. *Agardh Syst. Alg.* 100. *Hooker Crypt. Part* 1. 354.

Common on marine rocks, especially where covered by sand, likewise on "wooden posts and rails in the sea," on which it forms large patches. Filaments three to fifteen inches in length, straight, brittle, and somewhat rigid, about the thickness of coarse thread or hog's bristle, harsh to the touch, bright green. Articulations visible to the naked eye. "Endochrome finally bipartite."

Colour excepted, the figure on our plate, and certainly some of the description in English Botany, appears to belong rather to the next species.

CONFERVA COLLABENS. *Flaccid Verdigris Conferva.*

Filaments simple, straight, thick, flaccid, and subgelatinous, of a brilliant, permanent, æruginose green colour, tufted. Articulations rather longer than broad.

Conferva collabens, *Agardh Syst. Alg.* 102. *Hooker Crypt. Part* 1. 354. C. ærea, β. lubrica, *Dillwyn Conf. Syn.* 48.

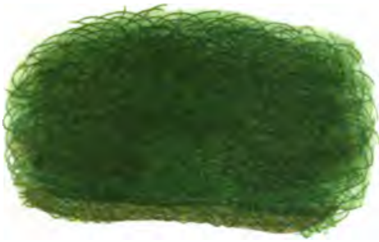
"Found at Yarmouth, on a floating piece of deal. Filaments three or four inches long, twice as thick as in *C. ærea*, of a splendid æruginose green colour, which is fully preserved in drying, very gelatinous, adhering most closely to paper; dissepiments much contracted. A highly beautiful plant; very different in my opinion from *C. ærea*, with which Dillwyn has confounded it."—*Hooker*.

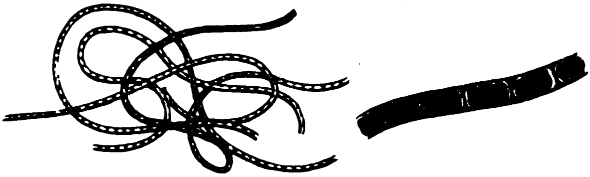
A specimen of this in my herbarium, obtained between thirty and forty years ago, from the woodwork of a sluice in the sea, near Margate, retains all its original brilliancy of colour, and is unquestionably a very distinct species from the last; the filaments, however, are much more slender than above described, those of the more frequent and abundant *C. ærea* being often much thicker, so far at least as my own acquaintance with them extends.

In the dry state *C. ærea* is exceedingly harsh and wiry, loses its colour, acquiring a pale yellowish-brown hue, and does not adhere at all to paper: it is indeed surprising that the present should ever have

2309

2483





Conferva implexa

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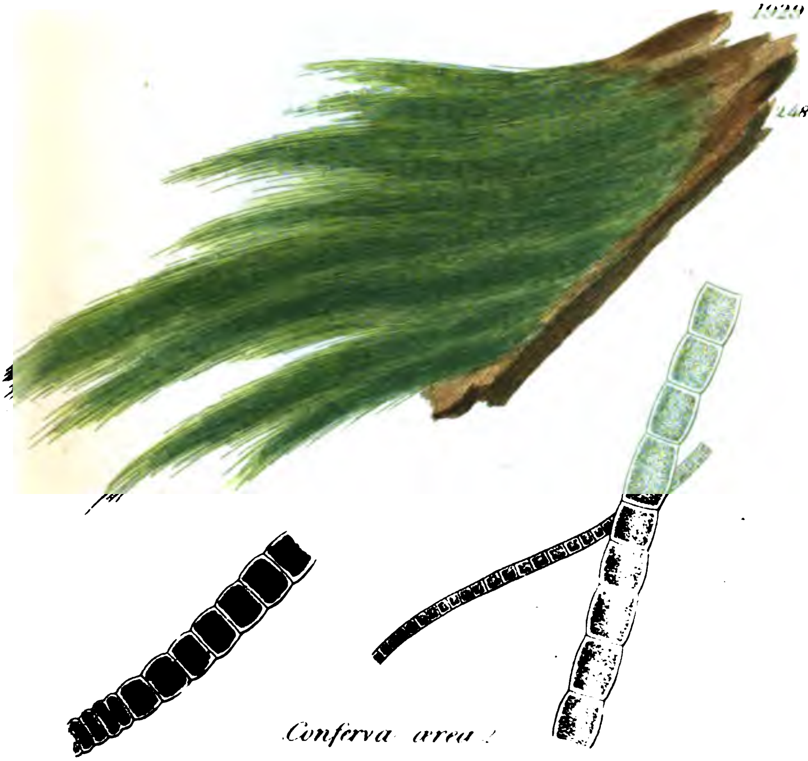
2482.



Conferva aerea ?

Sep 1 1808 Publi d by Ja [illegible] London

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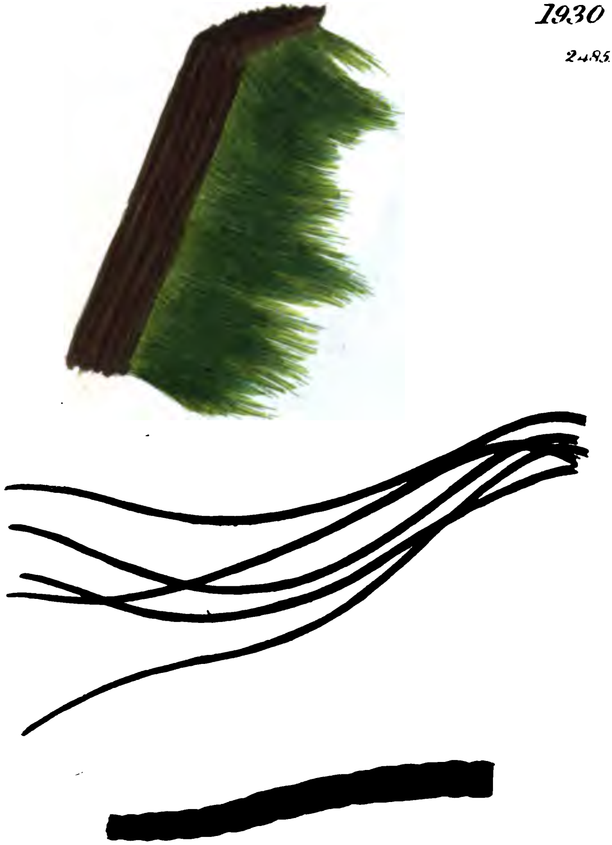

Conferva Youngana

Sept. 1 1808 Publish'd by Jas. Sowerby London.

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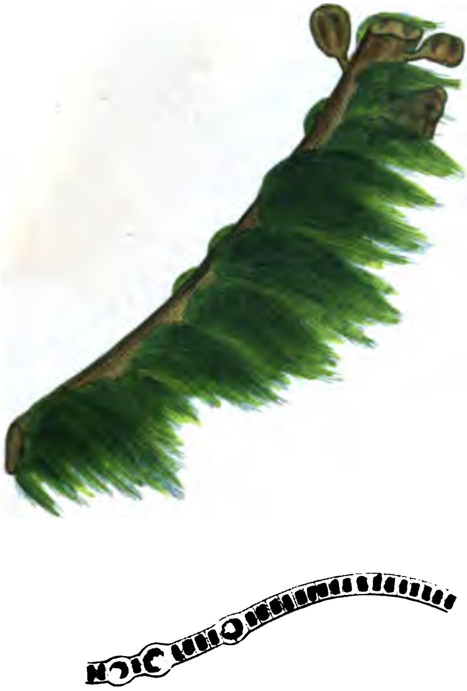
2486



Conferva flacca ?

Oct. 1 1808. Publish'd by Ja.s Sowerby London.

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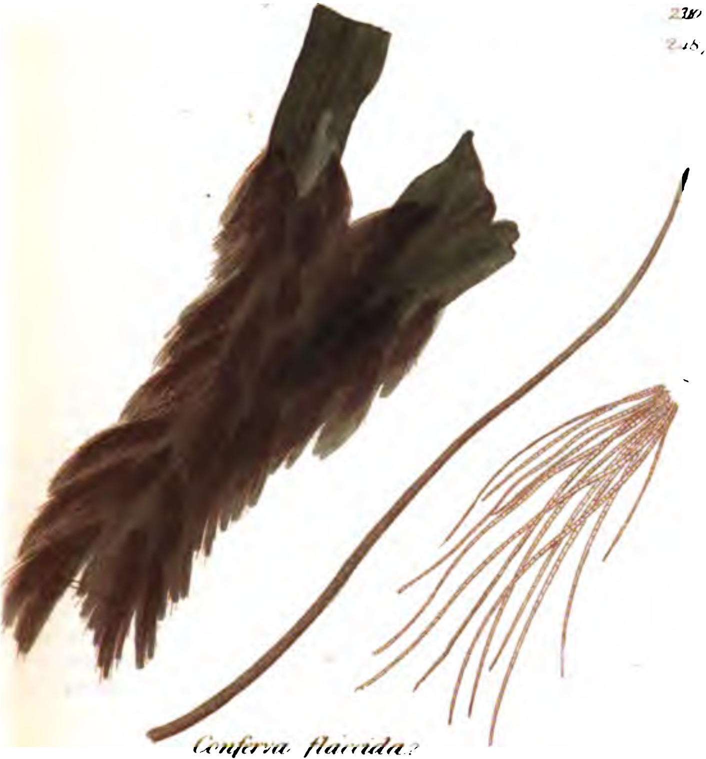

Conferva flaccida?

Aug 1 1812 published by Ja^s. Sowerby London.

been regarded as a mere variety of it; if species are ever clearly definable in a genus so low in the scale, they are unquestionably so here.

CONFERVA Youngana. *Mr. Young's Conferva.* Tab. **2485.**

Filaments simple, short, straight, tufted, bright green, somewhat rigid. Articulations about as long as broad; dissepiments contracted.

Conferva isogona, *E. B.* 1930. C. Youngana, *Dillwyn Conf. tab.* 102. *Agardh Syst. Alg.* 101. *Hooker Crypt. Part* 1. 354.

Not unfrequent on rocks and timber in the sea, about high-water mark, forming small tufts from half an inch to an inch in height. Filaments obtuse, bright yellowish-green, rather rigid; variable in the length of the articulations, which are sometimes twice as long as they are broad.

CONFERVA flacca. *Small flaccid Conferva.* Tab. **2486.**

Filaments simple, short, tufted, bright green, flaccid. Articulations nearly twice as broad as long.

Conferva flacca, *Dillwyn Conf. tab.* 49. *E. B.* 1943. *Agardh Syst. Alg.* 102. *Hooker Crypt. Part* 1. 354.

Common on the shores of England, epiphytic on the larger *Fuci*, or growing on wood-work in the sea. The filaments form dense bright green tufts, from half an inch to an inch in length, very soft, flaccid, and slimy to the touch; and are, besides the latter character, well distinguished from those of *C. Youngana* by the comparative shortness of the articulations, which are nearly, if not quite, twice as broad as long, neither are the dissepiments contracted as in the latter species.

The enlarged appearance of some of the articulations in our magnified figure is by no means of unfrequent occurrence in the plants of this genus, and has nothing to do with the specific character of the one before us, being in all probability occasioned by the swelling of the granules of the endochrome prior to their dispersion for the purpose of reproduction by the rupture of the containing vesicle.

††† *Marine. Parasitic.*

CONFERVA flaccida. *Flaccid rusty Conferva.* Tab. **2487.**

Filaments simple, flaccid, short, olivaceous, forming penicillate, parasitical tufts, springing from a small tubercle. Upper articulations as long as broad, lower half as long.

Conferva flaccida, *Dillwyn Conf. Syn. tab.* C. *E. B.* 2310. *Agardh Syst. Alg.* 102? *Hooker Crypt. Part* 1. 355.

A very common parasite on some parts of the coast of England, growing on *Fucus vesiculosus* and *serratus*, as well as on *Cystoseira fibrosa*, which are sometimes nearly covered by it. The filaments, of a dull olive-brown colour, very flaccid and tender, and seldom more than half an inch in length, grow in pencil-like tufts, connected at the base by a small tubercle. The tufts are occasionally so numerous and so closely set, as almost to conceal the supporting plant.

CONFERVA fucicola. *Larger parasitic Conferva.*

Filaments flaccid, yellowish-brown, penicillate from a minute tubercle. Articulations about twice as long as broad.

Conferva fucicola, *Velley Plant. Marit. tab.* 4. *fig.* 2. *Dillwyn Conf. tab.* 66. *Lyngbye Hydroph. Dan. tab.* 50. *Hooker Crypt. Part* 1. 354.

Common as a parasite on *Fucus vesiculosus*, &c., generally in the form of little, dense, subglobose tufts, about half an inch high, of a somewhat ferruginous hue. Certainly a very distinct species from the preceding.

"Filaments branched at the base, within the tubercle. Tubercles variable in size; in tufts of the first year hardly perceptible,—from this period they increase by degrees, until at length they become globular, with a slender neck, and then drop off. In autumn, many of the tufts assume a yellowish or ochrey colour, the effect of age and long exposure to the sun, and in this state they constitute the *C. fucicola* of Agardh."—*Carmichael in Hooker.*

CONFERVA curta. *Small parasitic Conferva.* Tab. 2488.

Filaments simple, minute, rigid, tapering at the base, pale brown, subpenicillate from a tubercle. Articulations about as broad as long.

Conferva curta, *Dillwyn Conf. tab.* 76. *E. B.* 2084. *Agardh Syst. Alg.* 103. *Hooker Crypt. Part* 1. 355.

Not unfrequent, at least on the southern shores of England, growing on various species of *Fucus*, and on *Halidrys siliquosa*. Filaments rarely a quarter of an inch in height, springing from a minute tubercle, "formed of denser, branching filaments," pale brown, tapering at the base, gradually enlarging upwards and terminating obtusely. Articulations nearly as broad as long, slightly tumid, owing to the contraction of the joints.

The endochrome of the terminal vesicle and of the one next to it, in each filament, becomes, eventually, of a much darker hue than that of the lower ones, whence probably these only are concerned in the propagation of the species.

CONFERVA scutulata. *Parasitic Target Conferva.* Tab. 2489.

Filaments branched at the base, densely combined into a depressed peltate mass, rooted in the centre; olive-brown. Articulations as broad as long.

Conferva scutulata, *Smith E. B.* 2311. *Hooker Crypt. Part* 1. 355.

Found by Mr. Borrer at Brighton, growing on *Himanthalia lorea*, and (as appears from his original communication sent with the specimens) previously by Miss Hutchins on the coast of Ireland, whence she sent specimens and drawings to Mr. Turner.

"The infested plant is generally distorted at each spot where it nourishes one of these singular parasites, whose aggregate root is central and strong, deeply penetrating into the substance of the plant that bears it. The under side of the shield-like mass of the *Conferva* is all, except the centre, unconnected with the *Himanthalia*: the

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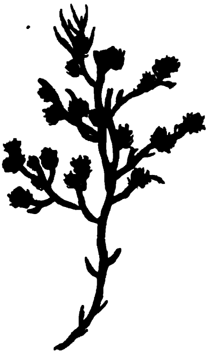

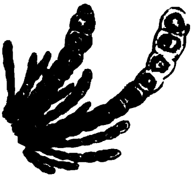

Conferva curta?

Nov 1 1811 published by J^s Sowerby London

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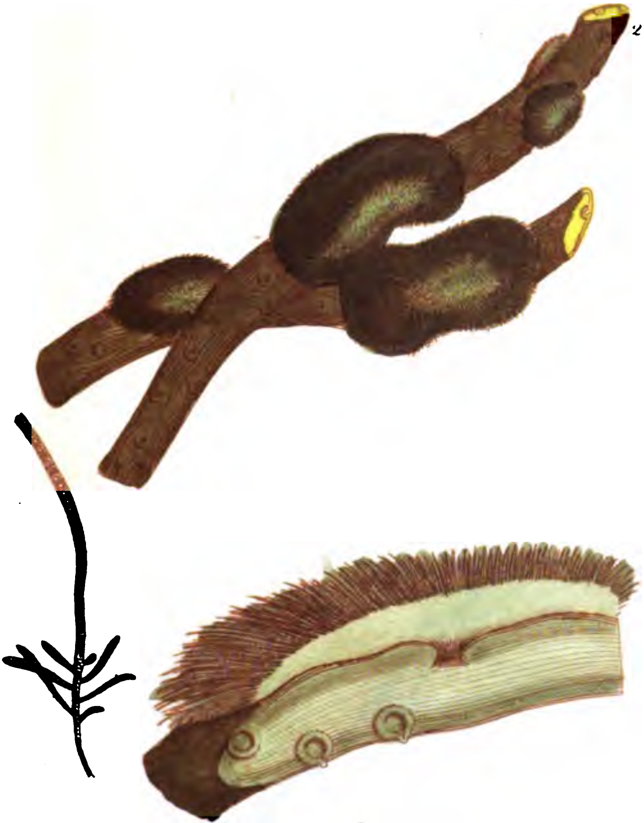

Conferva scutulata.

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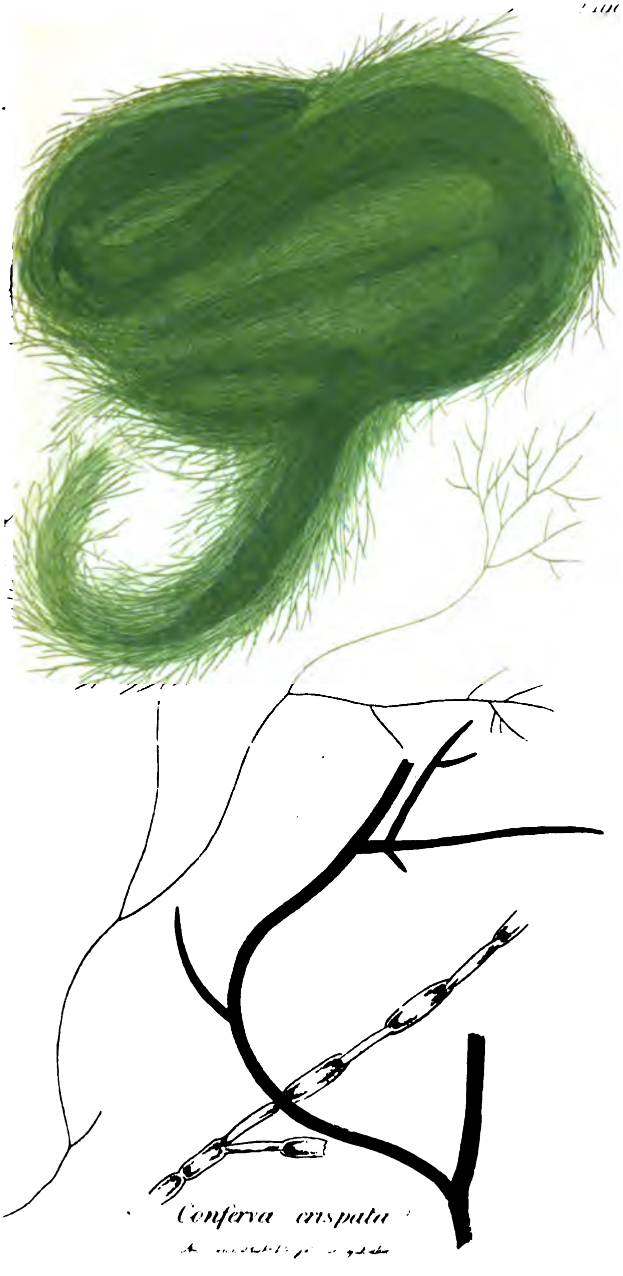

Conferva crispata

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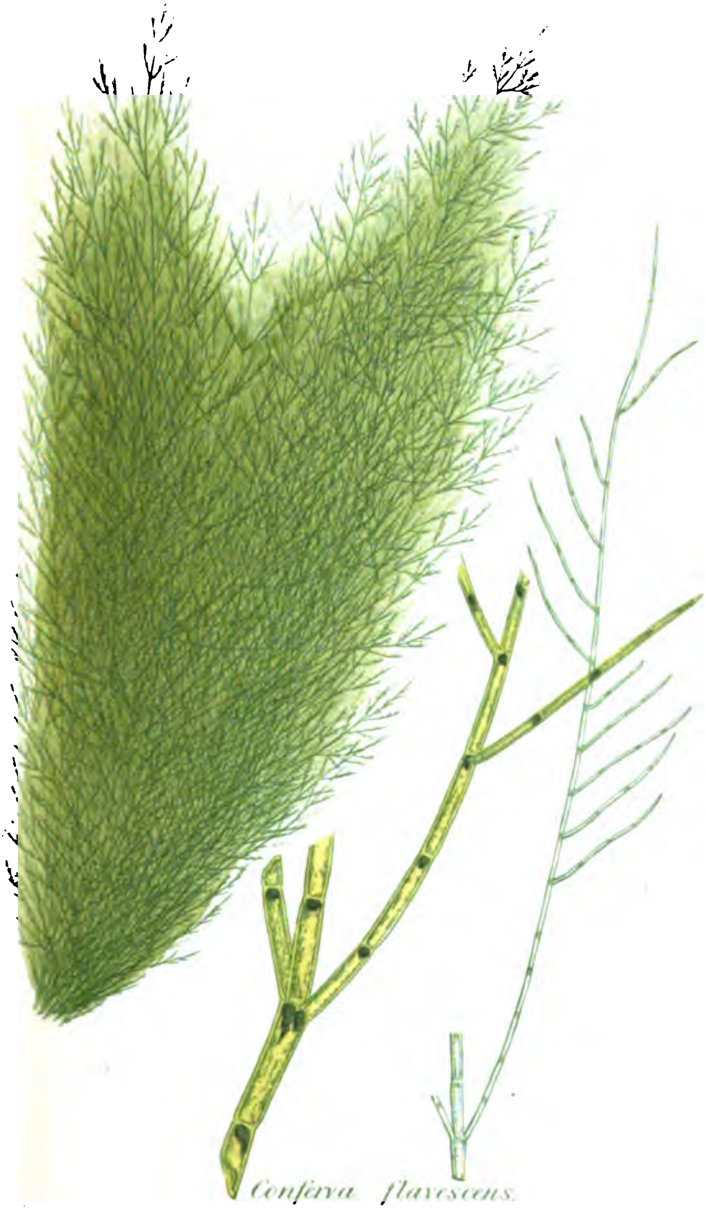

Conferva flavescens.

Nov. 1. 1809 published by Jas Sowerby London

upper side is shaggy with the prominent, elongated filaments, whose lower parts, bearing many short, blunt, simple branches, are compacted into a dense, viscid, pale, apparently homogeneous mass."—*Smith.*

I am altogether unacquainted with this species, unless from the original specimens in the herbarium, which have been too carelessly preserved to afford at this time any satisfactory evidence of the structure above described; a structure, however, so nearly according with that of *C. curta*, *fucicola*, and *flaccida*, that its affinity to those species can scarcely be questioned. Whenever the amorphous genus *Conferva* shall be remodelled, the plants of this parasitic section must form a separate type, distinguished as they are by their remarkable habit and style of growth.

** *Filaments branched.*

† *Growing in fresh water.*

CONFERVA CRISPATA. *Branching cross-jointed Conferva.* TAB. **2490.**

Filaments bright green, branched, crisped and entangled; branches numerous, alternate, acute. Articulations several times longer than broad, alternately contracted when dry.

Conferva crispata, *Roth. E. B.* 2350. *Dillwyn Conf. tab.* 93. *Agardh Syst. Alg.* 109. *Hooker Crypt. Part* 1. 356.

Collected in pools in Sussex, by Mr. Borrer. Filaments about a foot long, or more, densely entangled, rather tough, destitute of gloss, curled and crisped, especially when old. Articulations four or five times as long as broad; by drying, they become elliptical and compressed alternately.

The only apparent distinction between this and *C. fracta*, tab. 2492. consists in the greater length of the articulations, which is perhaps only accidental. I fear that little dependence can be placed upon the alternate compression of the vesicles in drying.

CONFERVA FLAVESCENS. *Yellowish branched Conferva.* TAB. **2491.**

Filaments forming pale yellowish-green strata, repeatedly branched, slender; branches alternate, or subdichotomous, erecto-patent, with scattered, elongated, alternate or secund ramuli. Articulations many times longer than broad.

Conferva flavescens, *Roth. Dillwyn Conf. Syn. tab. E. E. B.* 2088. *Agardh Syst. Alg.* 112. *Hooker Crypt. Part* 1. 356. C. pinnatula, *Dillwyn Conf. tab.* 95.

Not unfrequent in ditches and pools in marshes, especially in the vicinity of the sea, and in salt water as well as in fresh, forming large masses or tufts which rise in the summer and float on the surface. Filaments light yellowish-green, repeatedly branched throughout; the larger branches sometimes opposite or forked; the ultimate ones short, often spreading in two opposite directions in short alternate rows. Articulations six to nine times as long as broad. It does not adhere to paper in drying.

CONFERVA FRACTA. *Broken divaricated Conferva.* **TAB. 2492.**

Filaments forming dull green strata, much-branched and entangled, rigid; branches scattered, divaricated. Articulations two or three times as long as broad.

Conferva fracta, *Fl. Dan.* *Dillwyn Conf. tab.* 14. *E. B.* 2338. *Agardh Syst. Alg.* 109. *Hooker Crypt. Part* 1. 356. C. vagabunda, *Linn. Hudson.* C. divaricata, *Roth.*

Very common in ditches, pools and marshes, and in both fresh and salt water, forming extensive strata, eventually floating on the surface. Filaments very much and repeatedly branched in an irregular order, but with all the divisions, even to the smallest, widely divaricated. Somewhat rigid.

CONFERVA FLEXUOSA. *Zigzag-branched Conferva.* **TAB. 2493.**

Filaments forming entangled green masses, once or twice branched, zigzag; ultimate branches alternately distichous, spreading. Articulations five or six times as long as broad.

Conferva flexuosa, *Fl. Dan.* *Dillwyn Conf. tab.* 10. *E. B.* 1944. C. fracta, *β. Hooker Crypt. Part* 1. 356.

Found in salt-water ditches. The filaments form entangled green masses at the bottom of the water, but finally rise and float: the principal ones are capillary, of a dark blackish-green colour, and once or twice branched; the ultimate ones, or ramuli, are of a pale yellowish-green, and disposed, several together, in a row pointing to one side, the next row being directed the contrary way. Sometimes minute shoots make their appearance on the upper side of the ramuli, as in the middle figure.

This, together with *C. crispata* and *C. flavescens*, is perhaps only a variety of *C. fracta*, and intermediate states may possibly be found between all of the four, but in the present state of our knowledge of these obscure plants we must not discard specific distinction too lightly.

CONFERVA GLOMERATA. *Green clustered Conferva.* **TAB. 2494.**

Filaments tufted, from a scutate base, bright green, very much branched, bushy; branches crowded, irregular, suberect; ultimate ramuli secund, subfasciculate. Articulations five or six times as long as broad.

Conferva glomerata, *Linn.* *Dillwyn Conf. tab.* 13. *E. B.* 2192. *Agardh Syst. Alg.* 107. *Hooker Crypt. Part* 1. 356.

Found in clear streams and rivulets, generally attached to pebbles. The whole plant is of a bright shining green, very smooth, but not at all viscid or gelatinous to the touch. The principal stems are several inches long, sending out numerous capillary branches, which are variously subdivided, and terminate ultimately in ranges of little, short ramuli, all directed one way, which gives the plant a peculiar clustered or tuft-like aspect. Articulations at least five times longer than they are broad.

An exceedingly variable species, but well-charactered by the peculiar arrangement of the ultimate subdivisions, as exhibited in the magnified portion on our plate.

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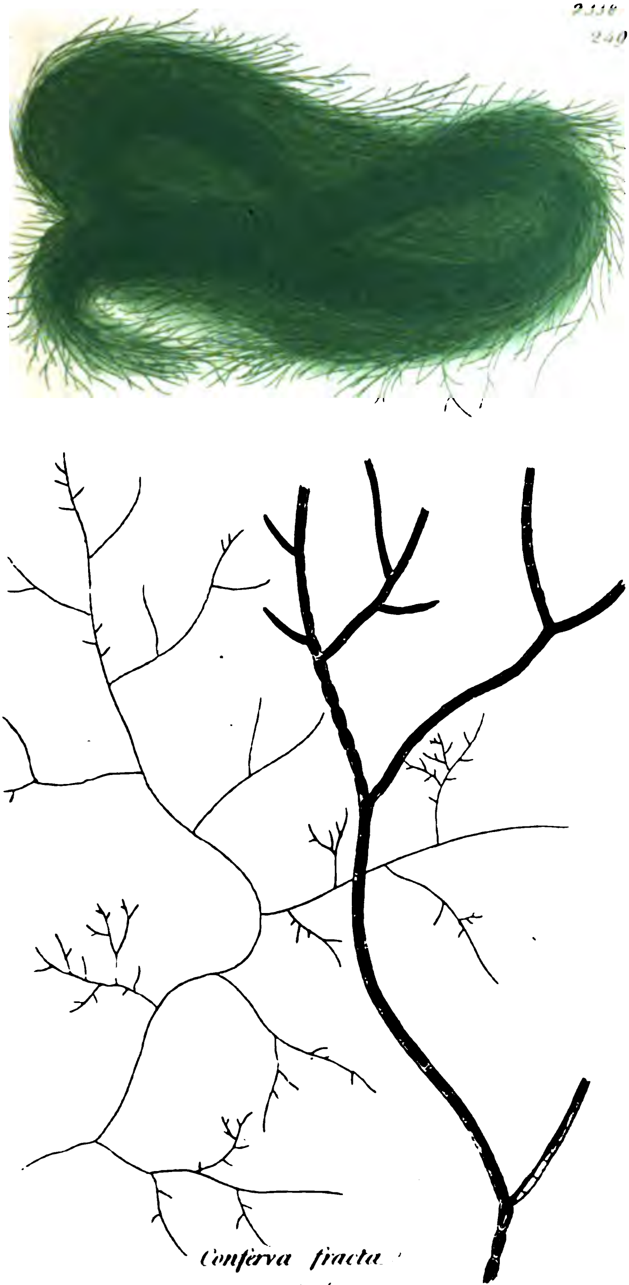
2402.



Conferva fracta.

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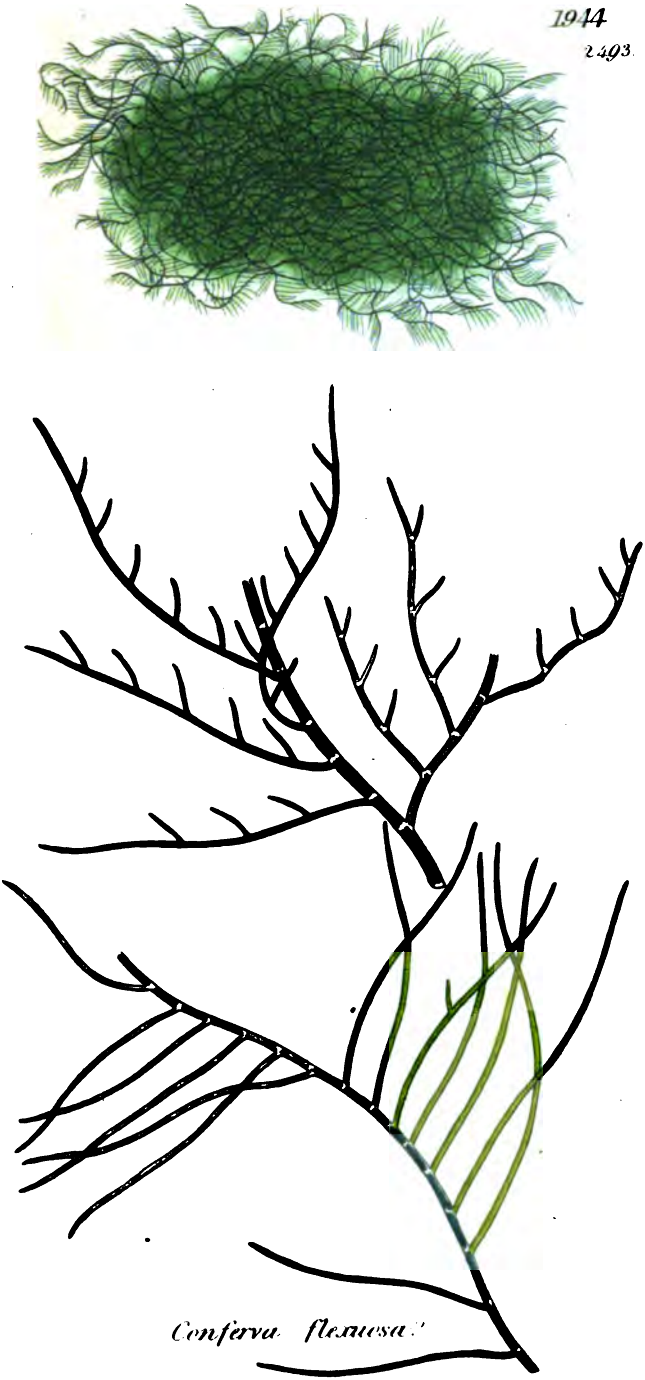

Conferva flexuosa.?

Oct 1 1808. Publish'd by Ja.s Sowerby London.

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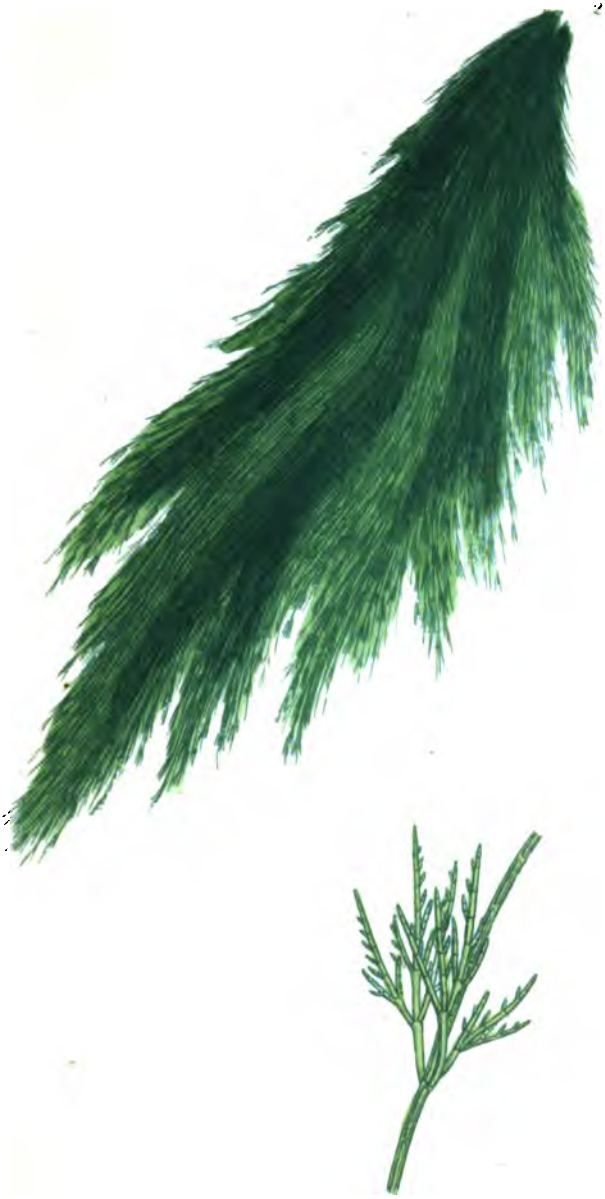

Conferva glomerata.

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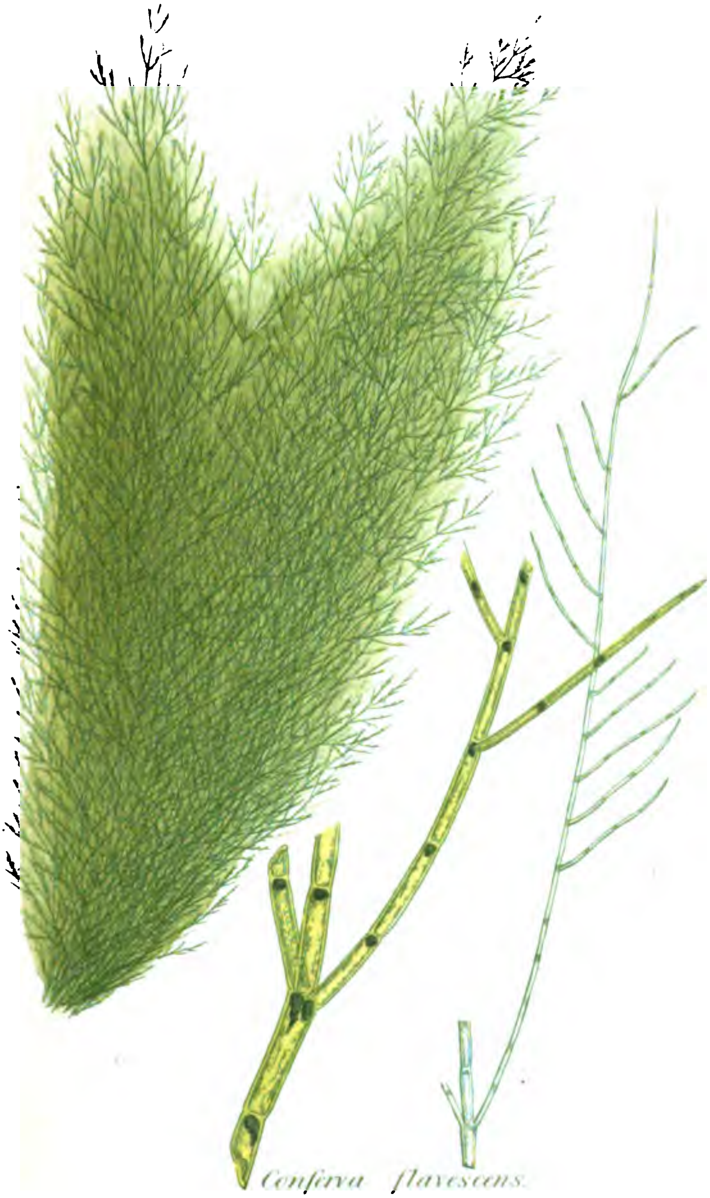

Conferva flavescens.

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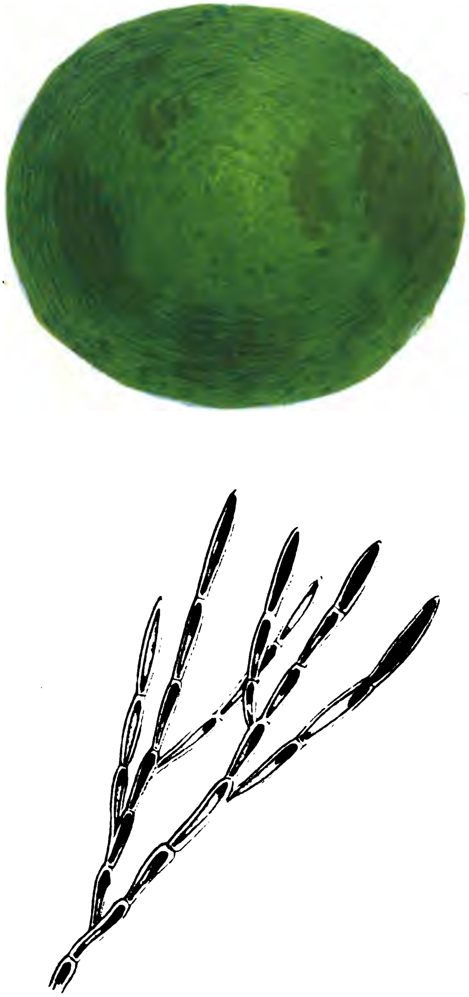


Conferva ægagrophila?

Nov. 1 1804 Published by Ja.s Sowerby London

CONFERVA LÆTE-VIRENS. *Light-green bushy Conferva.* TAB. 2495.

Tufted, from a scutate base, pale green, very much branched, rather rigid; ultimate ramuli secund. Articulations several times longer than broad.

Conferva læte-virens, *Dillwyn Conf. tab.* 48. *E. B.* 1854. C. glomerata, β. marina, *Agardh. Hooker Crypt. Part* 1. 357.

Common in the sea, attached to rocks, stones, and the larger Algæ; it often nearly fills the water left in the little basins or hollows of the rocks by the recession of the tide, resembling a greenish cloud; but the colour is variable, frequently as deep as that of *C. glomerata*, of which it seems to be merely a variety, separable by a slight difference in habit, the result of vegetation in a different medium.

CONFERVA ÆGAGROPHILA. *Globe Conferva. Moor Balls.* TAB. 2496.

Filaments radiating from a central point, repeatedly branched, forming dense roundish balls; branches subsecund, straight. Articulations three to five times longer than broad, the uppermost subcylindrical, the lower enlarged upwards.

Conferva ægagrophila, *Linn. E. B.* 1377. *Dillwyn Conf. tab.* 87. *Hooker Crypt. Part* 1. 357.

This singular vegetable production is a native of alpine lakes in many parts of Europe, often lying in great abundance at the bottom of the water, and occasionally only rising and floating on the surface. It has been found in the lakes of the north of England, Wales, Scotland, and the district of Cunnemara in Ireland, but is generally esteemed rare. In size it varies from that of a small pea to three or four inches in diameter, and its form is always nearly spherical. Internally, the larger specimens are hollow, without any nucleus; and, when examined, their substance is found to consist of innumerable green, pellucid, repeatedly-branched filaments, firmly entangled together. The vesicles, when the plant is recently taken from the water, are turgid with fluid, and nearly cylindrical, but slightly swollen towards the apex, where the granular matter of the endochrome seems chiefly collected as a green opake mass: in the terminal vesicle, however, of each branch, it assumes often a dark brown hue and more solidity, probably becoming the medium of reproduction, and escaping in the form of sporules.

The origin of this curious plant would seem, from examination of small specimens, to be the emanation of several filaments, or perhaps single vesicles, from a common centre, perhaps fixed, as observed by Sir J. E. Smith, to some earthy particle, which they eventually leave, the parts first formed withering away during the ultimate growth, while the lengthening filaments, by branching and extending themselves equally in all directions, form a gradually enlarging hollow globe.

The specific name, *ægagrophila*, alludes to its resemblance to the hairy balls so called, which are occasionally found in the stomachs of goats, cows, and other animals.

The elasticity of the balls may be estimated by the fact of their having been sometimes used as pen-wipers, in the north of England.

†† *Growing in the sea.*

[*C. flavescens*, *C. flexuosa*, and *C. læte-virens* of the previous section are found in salt water, though, with the exception of the last-named, not wholly so.]

CONFERVA PELLUCIDA. *Pellucid three-branched Conferva.* TAB. 2497.

Filaments rigid, subcartilaginous, erect, much-branched, bright green, pellucid; branches trichotomous, their axils acute. Articulations four or five times as long as broad.

Conferva pellucida, *Hudson*. *E. B.* 1716. *Dillwyn Conf. tab.* 90. *Agardh Syst. Alg.* 120. *Hooker Crypt. Part* 1. 357.

Rare, growing on rocks, seldom above low-water mark. Frond naked and stem-like below, fixed by an expanded, fibrous disc, much and repeatedly branched above; the branches generally three together throughout, the short, ultimate ramuli excepted, which are opposite or alternate. Base of the stem purplish or brown, the rest of the plant of a bright pellucid green. Very rigid and almost wiry to the touch.

CONFERVA RUPESTRIS. *Green Rock Conferva.* TAB. 2498.

Filaments submembranaceous, dark green, rigid, straight, clustered, much-branched; branches erect, crowded; ramuli fascicled, appressed. Articulations three or four times as long as broad.

Conferva rupestris, *Linn.* *Dillwyn Conf. tab.* 23. *E. B.* 1699. *Agardh Syst. Alg.* 117. *Hooker Crypt. Part* 1. 357.

Common on all rocky shores, growing in dense tufts on the rocks, pebbles, dead shells, and other solid bodies. Three to six inches long, very much and repeatedly branched; the branches mostly alternate, erect, and straight, sometimes opposite or clustered. Articulations several times longer than broad. In drying, the endochrome generally collects at the upper end of each vesicle, leaving the lower part nearly pellucid.

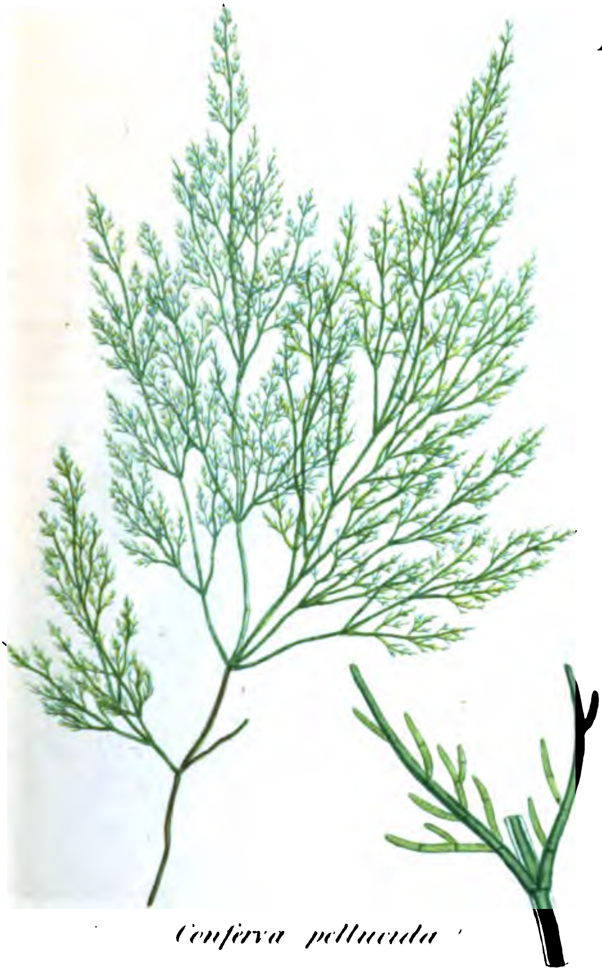
CONFERVA DIFFUSA. *Diffuse green Conferva.* TAB. 2499.

Filaments submembranaceous, rigid, dark green, flexuose, much-branched, subdichotomous; branches distant, elongated, bearing above a few short, patent, secund ramuli. Articulations three or four times as long as broad.

Conferva diffusa, *Roth.* *Dillwyn Conf. tab.* 21. *E. B.* 2289. *Agardh Syst. Alg.* 116. *Hooker Crypt. Part* 1. 358.

Frequent on rocks in the sea, but less common than *C. rupestris*, to which, however, it seems very nearly allied; so nearly indeed, in some forms of both, that it is suspected to be a variety. The fronds, as in that species, spring from a minute callous base, forming loosely entangled, dullish green tufts, from two to six inches long, rather

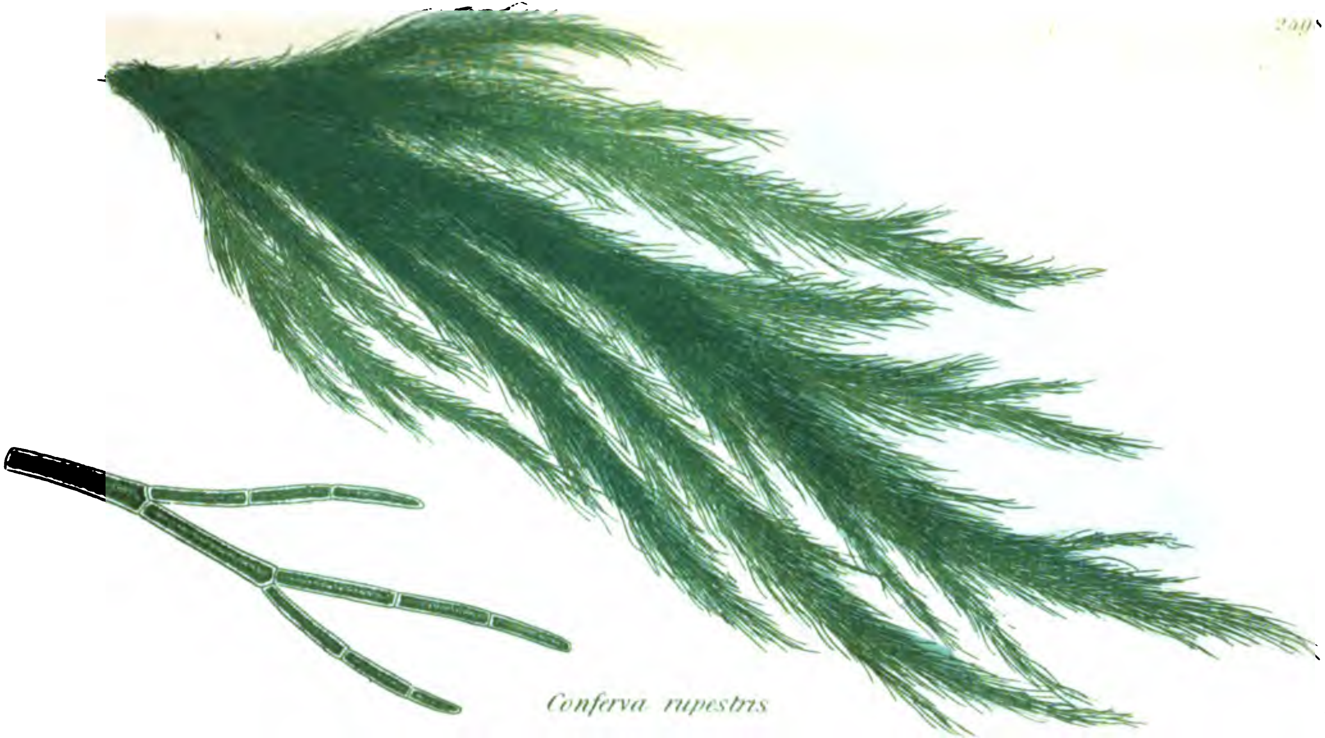
1716



Conferva pellucida

[illegible] Published by Ja. Sowerby London

1699



Conferva rupestris

Feb. 1. 1807. Publish'd by Jas. Sowerby, London.

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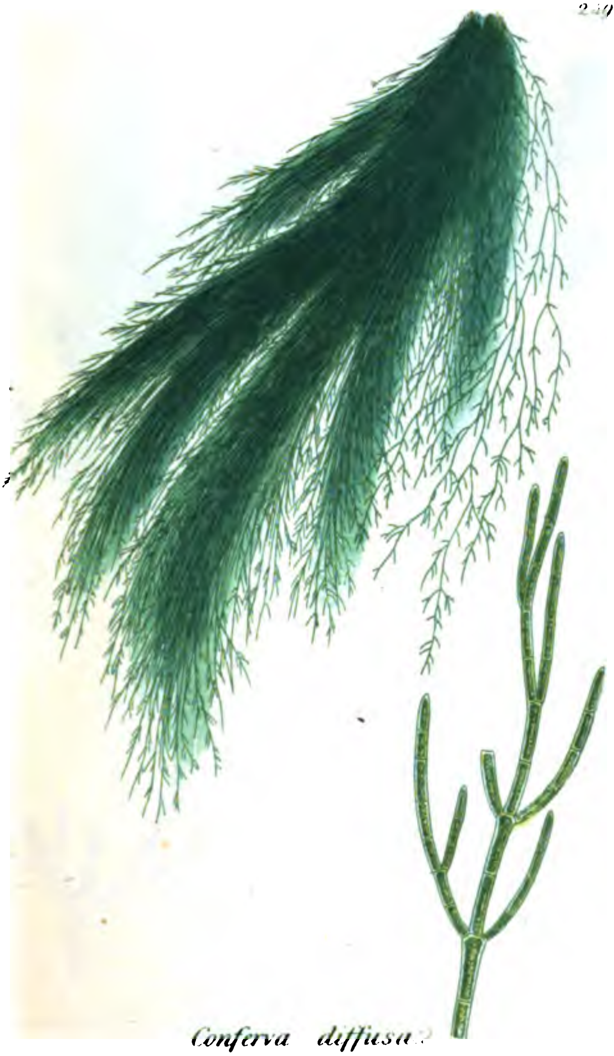
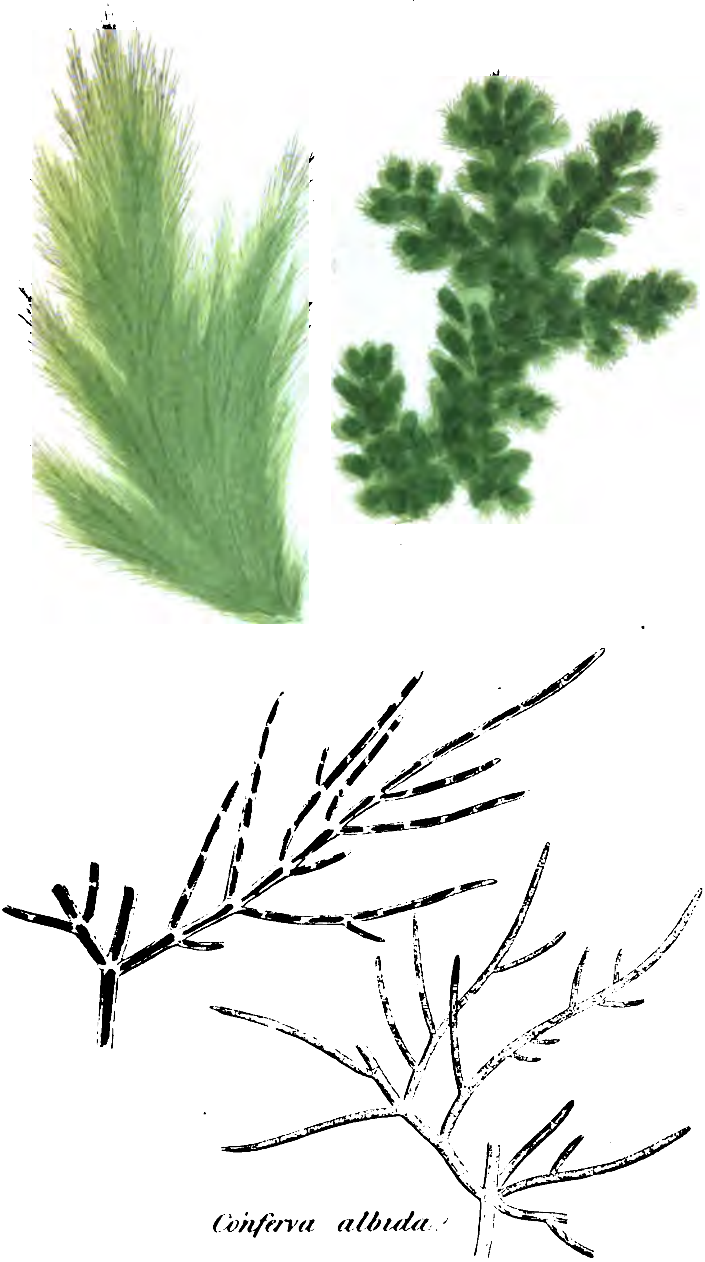
2399



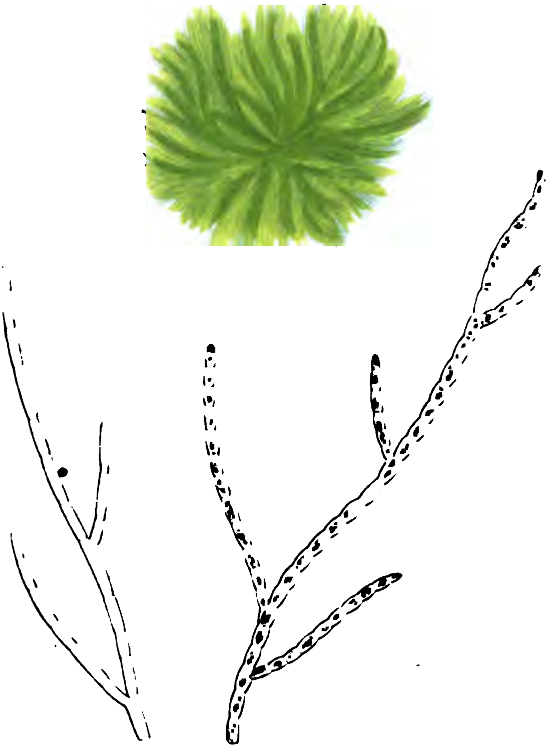
Conferva diffusa.

Published by J. Sowerby London



Conferva albida.

[illegible] published by Jas. Sowerby London



Conferva lanosa

Jan 1 1810 published by J. Sowerby Lond.

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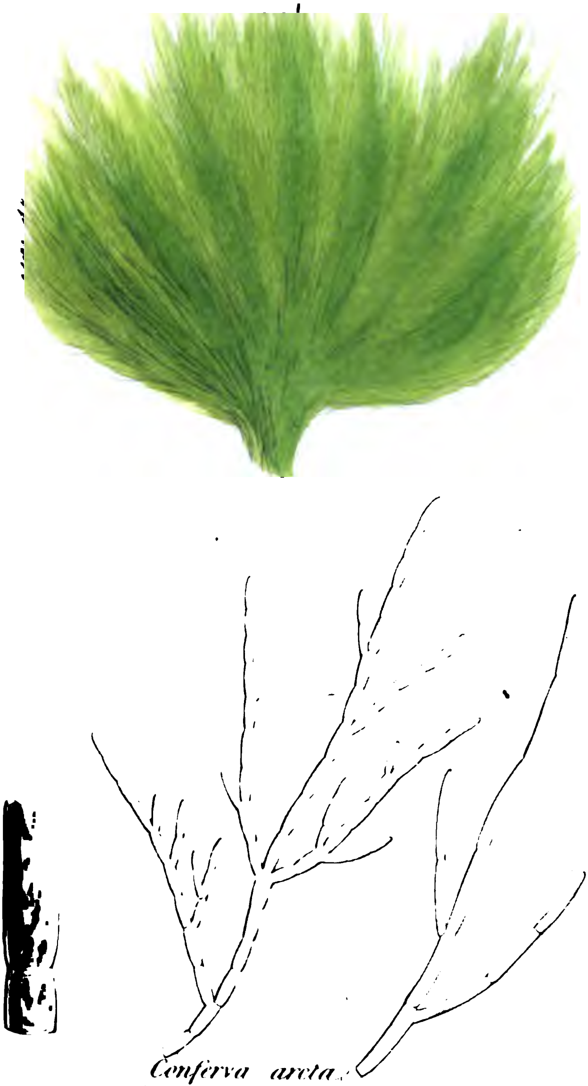
2562.



Conferva arcta.

Dec. 1. 1813 published by J. Sowerby London.

rigid and harsh to the touch. Filaments about the thickness of horse-hair, branched from the very bottom, but not copiously nor regularly; the branches zigzag, divaricated and spreading among each other; ultimate ramuli short, simple.

CONFERVA ALBIDA. *Whitish cottony Conferva.* TAB. **2500.**

Filaments very slender, flaccid, pale green, forming dense silky tufts; branches clustered, irregular, the uppermost ones patent and mostly opposite; ramuli opposite or secund. Articulations four times as long as broad.

Conferva albida, *Hudson. Dillwyn Conf. Syn.* 66. *tab. E. E. B.* 2327. *Hooker Crypt. Part* 1. 358. C. heterochloa, *Agardh Syst. Alg.* 115, *or* C. refracta, *id.* 114.

β. protensa. Elongated; ramuli straight, patent, irregular. *Dillwyn Conf.*

Found on many parts of the coast, generally growing on other Algæ, but sometimes attached to the rocks. Probably not uncommon. Filaments finely capillary, very much branched. Its cotton-like opacity, and the absence of all gloss, is remarkable, and the dense, tufted habit, caused by the copious, spreading subdivisions, which are interwoven into close masses, strengthens the resemblance to that substance, as does the whitish hue it quickly assumes by exposure.

Both of the varieties are figured on our plate.

CONFERVA LANOSA. *Woolly green Conferva.* TAB. **2501.**

Filaments slender, short, yellowish-green, repeatedly branched, forming dense tufts; branches remote, erect, straight, mostly alternate, with few ramuli; axils very acute. Lower articulations twice as long as broad, upper ones much longer.

Conferva lanosa, *Roth. Dillwyn Conf. Syn. tab. E. E. B.* 2099. *Agardh Syst. Alg.* 112. *Hooker Crypt. Part* 1. 358.

Common on rocks and on the larger Algæ. Filaments stoloniferous below, pale yellowish-green, forming dense woolly tufts about an inch high; they are much but distantly branched, the branches erect, virgate, mostly alternate, with very acute axils. Articulations somewhat tumid, owing to the contraction of the joints.

It adheres to paper in drying, becoming of a whitish-green hue.

Probably only a small variety of the following.

CONFERVA ARCTA. *Close green Conferva.* TAB. **2502.**

Filaments elongated, repeatedly branched, forming silky tufts of a bright green colour; branches erecto-patent, crowded, with few, irregularly-disposed ramuli. Lower articulations as long as broad, upper ones many times longer.

Conferva arcta, *Dillwyn Conf. Syn. tab. E. E. B.* 2098. *Agardh Syst. Alg.* 118. *Hooker Crypt. Part* 1. 359. "C. Vaucheriæformis, *Agardh.*"

Epiphytic on the larger Algæ, on various parts of the coast; forming dense, straight tufts from three to six inches high, of a bright, glossy, somewhat æruginose-green colour, stoloniferous at the base.

Filaments capillary, flaccid when dry, much and irregularly branched in their upper part chiefly, the branches but little spreading, and sometimes parallel to each other. Lower articulations about as long as broad, the upper ones gradually longer, increasing to seven or eight times more than their diameter.

CONFERVA RIPARIA. *Entangled Shore Conferva.* TAB. 2503.

Filaments elongated, slender, flaccid, decumbent, pale green, forming wide strata; nearly simple below, branched, divaricated and entangled towards the top; axils rounded. Articulations two or three times as long as broad.

Conferva riparia, *Roth*. *Dillwyn Conf. Syn. tab. E.* *E. B.* 2100. *Agardh Syst. Alg.* 106. *Hooker Crypt. Part* 1. 359. C. obtusangula, *Lyngbye Hydroph. Dan. tab.* 55.

A native of sand-covered rocks on several parts of the coast, generally about high-water mark. It composes dense tufts, of a pale but bright green colour. Filaments very little branched, except towards the upper part, where the divisions are much divaricated and entangled.

TRIBE XVII. TYNDARIDEÆ.

Plants filamentous, green, more or less distinctly articulated. Filaments inosculated to form a network, or finally uniting by the emission of transverse tubes. Fructification obscure; apparently resulting from the union of the endochrome of the uniting vesicles, forming sporidia. The species are generally found in stagnant water. They seem to stand as a connecting link between the *Confervea* and *Oscillatoriea*, approaching the former in the articulation of the filaments, and the latter in the structure of the endochrome.

GENUS DCLXXII. HYDRODICTYON. *Water-net.*

GEN. CHAR. *Filaments* forming a network with regular polygonal meshes. *Articulations* viviparous.

One of the most curious and beautiful types among the lower Algæ. Each side of the pentagonal or hexagonal meshes consists of an elongated vesicle, containing a pale green granular endochrome.

Named by Roth, from *ὕδωρ*, *water*, and *δίκτυον*, *a net*, in allusion to its remarkable structure.

2100

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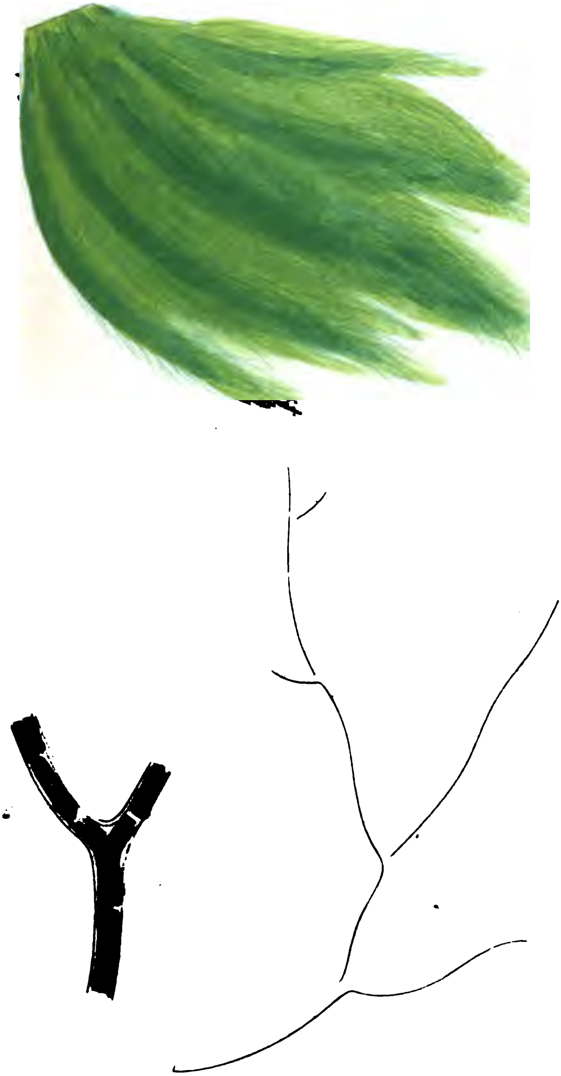

Conferva riparia.

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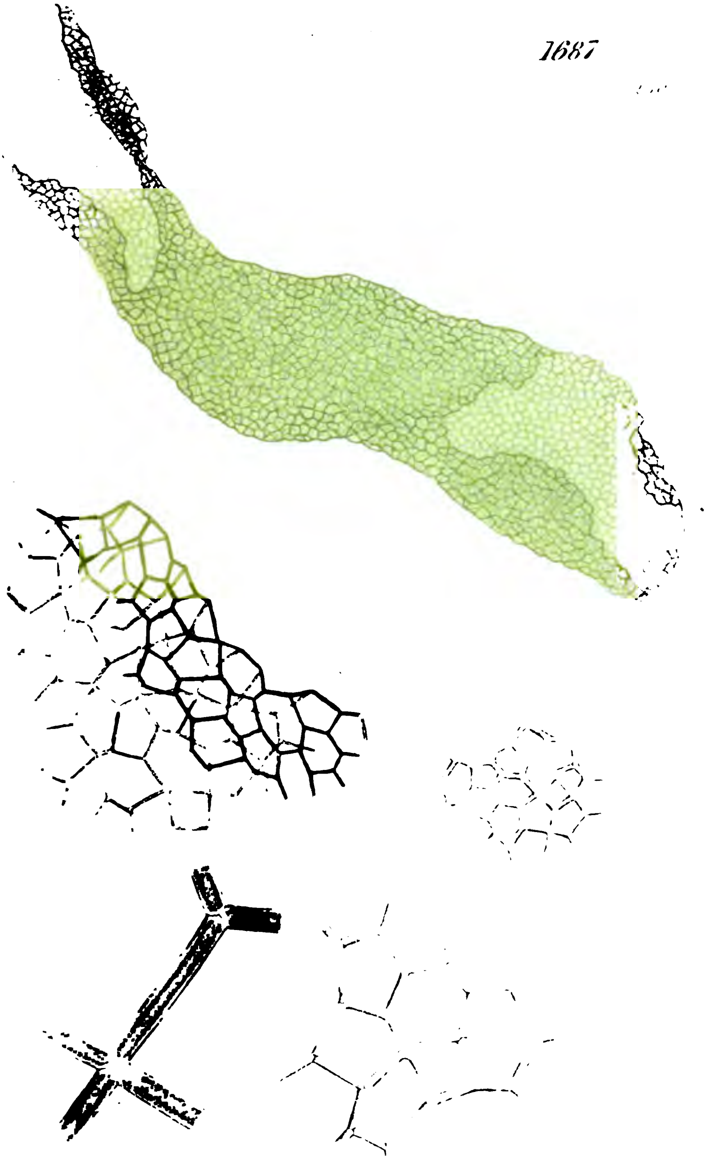
1687



Hydrodictyon utriculatum

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HYDRODICTYON utriculatum. *Common Water-net.* Tab. 2804.

Meshes mostly pentagonal, forming a tubular net, open at both extremities.

Conferva reticulata, *Linn. F. B.* 1687. *Dillwyn Conf. tab.* 97.
Hydrodictyon utriculatum, *Roth. Hooker Crypt. Part* I. 359.
H. pentagonum, *Vaucher Conf. tab.* 9.

Found in ditches and ponds in various parts of the middle and south of England, but either far from common or from its delicate texture frequently overlooked. It grows loosely floating in the water in the form of a pale green, tubular net, open at both ends, composed of meshes, varying in the number of their sides from four to six, but most frequently pentagonal, and in diameter from half a line to half an inch; the filaments, or rather vesicles forming the sides being generally about the thickness of human hair, though sometimes, it is said, equal "to that of the coarsest hog's bristle."

M. Vaucher observed the old plants to remain unchanged through the winter; but in the spring the joints swelled, and gave out simple, cylindrical masses of green matter, each of which soon became a reticulated tube, which in the course of two or three months grew to the full size of the original plant.

Genus DCLXXIII. MOUGEOTIA. *Mougeotia.*

Gen. Char. *Filaments* articulated, simple, finally united by transverse tubes. *Endochrome* uniform, granular; subsequently forming roundish masses at the point of conjugation.

Named in honour of M. J. B. Mougeot, a German botanist.

The species of this and the two following genera are remarkable for the manner in which the simple and originally separate filaments, floating side by side, or across each other in the water, unite at certain periods, by shooting out tubular processes from their corresponding vesicles, and thus form channels, through which the granules of the endochrome can pass from one into the other; subsequently to which operation, the filaments have been observed again to separate, and the masses of sporules, formed or perfected by the process, either in the intermediate channels or in the original vesicles, are dropped into the water.

M. Vaucher of Geneva, to whom we are much indebted for his numerous researches and observations regarding the economy of the freshwater Algæ, associated these equivocal existences under the title of *Conjugatæ*, in allusion to the singular habit which characters them, as distinct from the rest of the Confervoid series.

MOUGEOTIA GENUFLEXA. *Knee-bent Mougeotia.* TAB. 2305.

Light green. Filaments slender, brittle, eventually bent, and united here and there irregularly, at the angles, by short transverse tubes. Endochrome half-filling the articulations. Sporidia spherical.

Conferva genuflexa, *Roth. Dillwyn Conf. tab.* 6. *E. B.* 1914. Mougeotia genuflexa, *Agardh Syst. Alg.* 83. *Hooker Crypt. Part* 1. 360. Conjugata angulata, *Vaucher Conf. tab.* 8.

Very common in freshwater ditches and pools, floating in extensive dense, yellowish-green masses. Filaments at first straight, crossing each other in all directions, only becoming genuflexed before the act of inosculation, and at the points where it takes place. The vesicles seem to bulge out on the sides opposed, and the two projections uniting form the transverse tube which connects them: after the change has taken place in the disposition of the endochrome, they separate.

The articulations, or vesicles, in this species, are about three or four times as long as broad, but vary in different filaments, and are often much longer. The endochrome is finally condensed in the centre of each, in the form of a green line, not more than half-filling the cavity.

MOUGEOTIA COMPRESSA. *Compressed Mougeotia.*

"Filaments very fragile, curved, irregularly united by transverse tubes. Endochrome compressed. Sporidia spherical, lodged in the dilated transverse tubes."

Mougeotia compressa, *Agardh Syst. Alg.* 83. *Hooker Crypt. Part* 1. 360. Zygnema compressum, *Lyngbye Hydroph. Dan. tab.* 58.

Habit that of the preceding, and met with in similar localities.

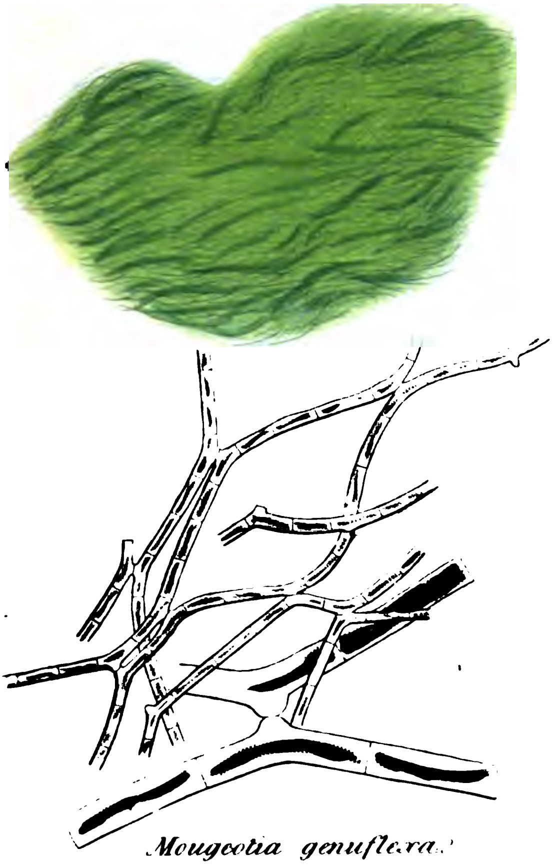
Surely not distinct from *M. genuflexa*, with which it is often intermingled; that is, if the compression of the endochrome, which, when viewed edgewise, looks like "a slender line running through the centre of the filament," be the only important differential character. The following remarks upon it as a distinct species, however, are valuable, as connected with the economy of the tribe, and justify our assertion.

"Filaments remarkably fragile, flying asunder in single joints, which then become more or less curved.—I am disposed to believe that each articulation of this species, if not of the whole genus, is a complete plant; in other words, that a filament is a chain of individuals, cohering somewhat in the manner of the genus *Salpa* among the *Mollusca*. In this point of view only can I account for what I have often remarked, the junction of two articulations and the formation of a sporidium after they had been detached from their respective filaments. The inosculation of these single joints takes place in the most capricious manner; sometimes it is central; at others, the end of one joint is presented to the centre of the other, or they meet end to end forming a right, an acute, or an obtuse angle."—*Carmichael in Hooker.*

Similar phænomena to those described by the indefatigable naturalist here quoted, will be found to occur both in *Zygnema* and *Tyndaridea.*

1944

2505



Mougeotia genuflexa.

July 1. 1808 Publish'd by Jas. Sowerby London.

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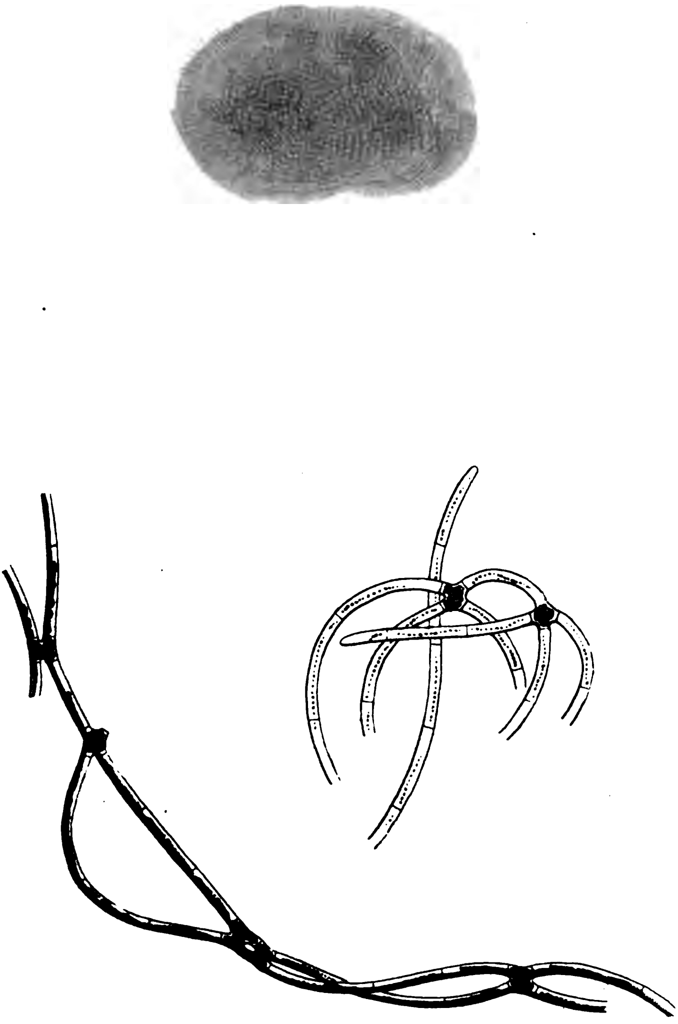

Mougeotia cærulescens.

Sep 1. [illegible] published by Jas. Sowerby London

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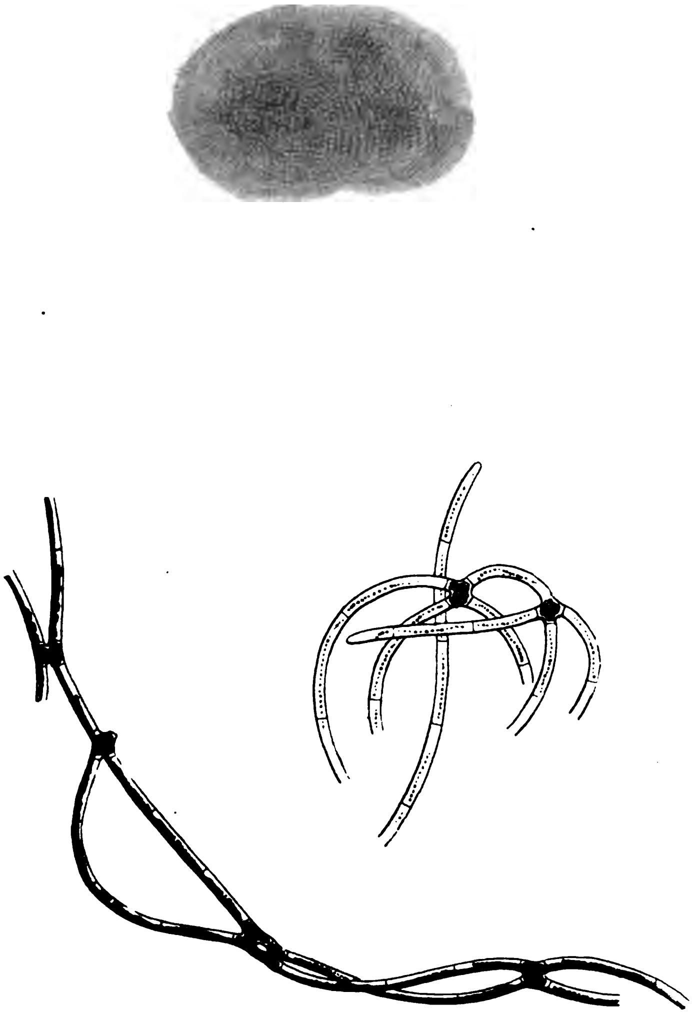

Mougeotia caerulescens.

Sep. 1. [illegible] published by Jas. Sowerby London.

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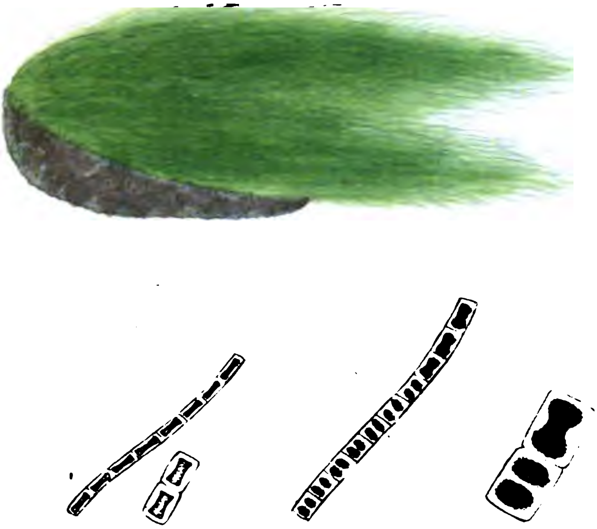


Tyndaridea pectinata.?

June 1 1806 Publiſhed by Jas. Sowerby London

MOUGEOTIA cærulescens. *Blueish Mougeotia.* Tab. 2506.

Light blueish-grey. Filaments slender, curved, fragile, inosculating without tubes. Sporidia green, cruciform.

Conferva cærulescens, *E. B.* 2457. Mougeotia cærulescens, *Agardh Syst. Alg.* 83. *Hooker Crypt. Part* 1. 360.

Apparently of rare occurrence in pools and ditches. First found by Mr. Borrer, in a boggy pool on Henfield Common, Sussex. The slender filaments form a blueish cloud-like mass in the water. Articulations from six to eight times as long as broad, nearly pellucid, with a central, slightly spiral line of green granules: such as meet, and unite, with those of approximating filaments, become eventually much shortened, breaking off generally in pairs, in the form of a cross, the centre of which is the green sporidium, formed by the collection of their consolidated endochrome.

Genus DCLXXIV. TYNDARIDEA. *Tyndaridea.*

Gen. Char. *Filaments* simple, articulated, finally inosculating by transverse tubes. *Endochrome* consisting of two roundish masses, which, after conjugation, unite and form a globular sporidium, lodged either in one of the articulations, or in the connecting tube.

Named after the *Tyndaridæ*, or *Castor and Pollux*, in allusion to the twin masses of endochrome in each vesicle.

TYNDARIDEA pectinata. *Comb-like Tyndaridea.* Tab. 2507.

Masses of the endochrome "transversely linear, pectinate." Sporidia "contained in the swollen transverse tubes."

Conferva bipunctata, *E. B.* 1610. Tyndaridea pectinata, *Harvey in Hooker Crypt. Part* 1. 361. Zygnema pectinatum, *Agardh Syst. Alg.* 78.

Not uncommon in stagnant water, either floating in thick, yellowish-green masses on the surface, or loose and straggling at the bottom. Filaments several inches long, slender: their articulations rather longer than broad, each containing two transversely oblong masses of endochrome, which in certain stages of growth are confluent.

Our figure is a very indifferent representation of this species, not showing the plant in its connected state, nor consequently the sporidia.

The name, "*pectinata*," is very ill-chosen, as the form of the endochrome is exceedingly variable; indeed, notwithstanding the difference in the disposition of the sporidia, I do not consider it distinct from the following, which is an equally variable plant and often grows intermingled with this. The lodgement of the sporidia is far from being uniform in many of the tribe.

TYNDARIDEA CRUCIATA. *Cross-like Tyndaridea.* TAB. 2512, fig. B?

Masses of the endochrome "roundish. Sporidia subglobose, lodged in one of the filaments."

Tyndaridea cruciata, *Harvey in Hooker Crypt. Part* 1. 361. Zygnema cruciatum, gracile, *and* decussatum, *Agardh Syst. Alg.* 77–78. Conferva bipunctata, *Dillwyn Conf. tab.* 2.

Common in stagnant water, under similar circumstances with the last. "Articulations marked by two roundish dots, which, after conjugation, unite to form a globular sporidium in one of the filaments."

TYNDARIDEA BICOLOR. *Variegated Tyndaridea.* TAB. 2508.

"Filaments simple, slender, straight, bright green. Articulations thrice as broad as long, white-edged, even; several of them together, here and there, empty, white and pellucid."—*Smith.*

Conferva bicolor, *E. B.* 2288. Tyndaridea bicolor, *Harvey in Hooker Crypt. Part* 1. 361.

Found by Mr. Borrer, growing on stones, in a rapid streamlet, at Henfield, Sussex. The great peculiarity of this species consists in an interruption of the endochrome here and there, which is the more remarkable, in consequence of each articulation in which it terminates being rounded off externally, as shown in our magnified figure, making the extremity, on either hand, of an oval spot, formed of an assèmblage of a greater or less number of perfectly coloured joints.

A very indefinite member of the genus.

GENUS DCLXXV. ZYGNEMA. *Zygnema.*

GEN. CHAR. *Filaments* simple, articulated, finally inosculating by transverse tubes. *Endochrome* forming dotted, spiral rings, which, after conjugation, are condensed into a sporidium in one of the filaments.

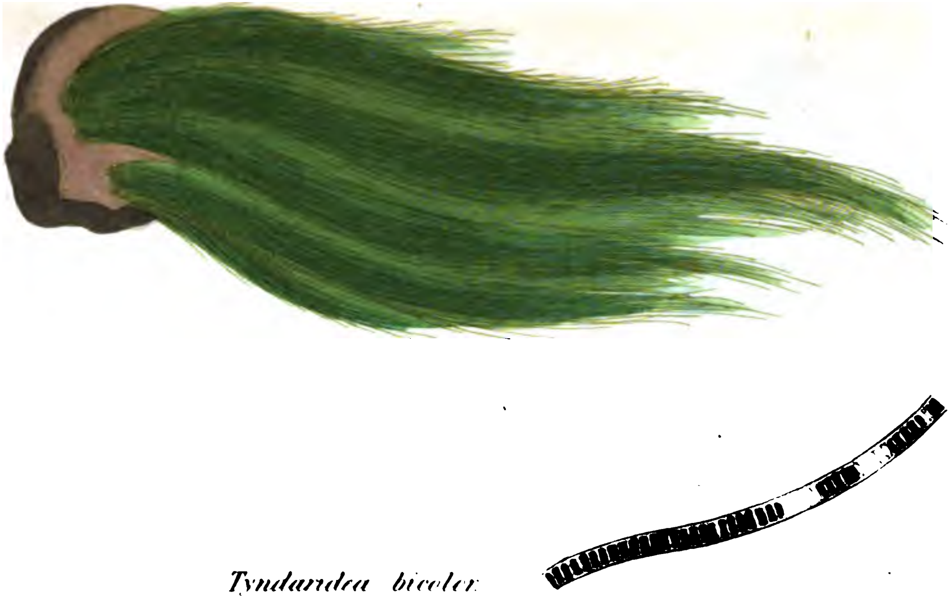
A very well-defined genus, beautifully charactered by the spiral form of the endochrome. The name, first bestowed by Agardh, refers to the inosculation of the filaments, from ζυγὸς, *a yoke*, and νῆμα, *a thread.*

ZYGNEMA NITIDUM. *Shining Zygnema.* TAB. 2509.

Deep shining green. Filaments simple, slender, lubricous; conjugating parallelly. Endochrome forming several close spiral lines.

Conferva nitida, *Dillwyn Conf. tab.* 4. *fig. C. E. B.* 2337. Zygnema nitidum, *Agardh Syst. Alg.* 82. *Hooker Crypt. Part* 1. 362. Conjugata princeps, *Vaucher Conf.* 64. *tab.* 4.

Not uncommon in ponds and ditches, composing dense, lubricous masses, of a very dark shining green colour. Filaments rigid, about the thickness of horse-hair. Articulations cylindrical, rather longer



Tyndaridea bicolor.

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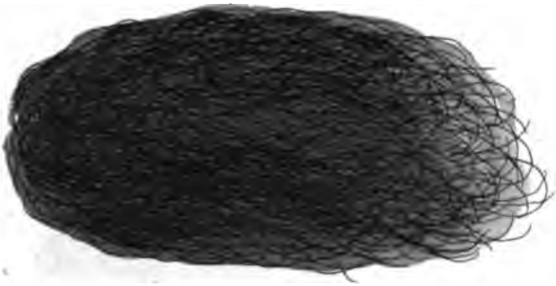
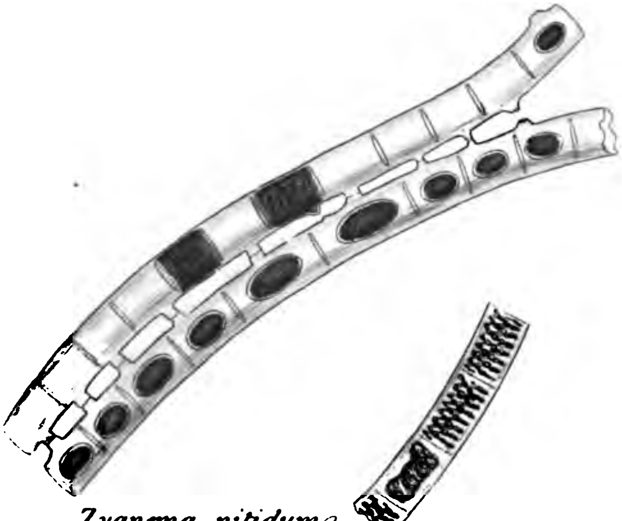
2509.





Zygnema nitidum.

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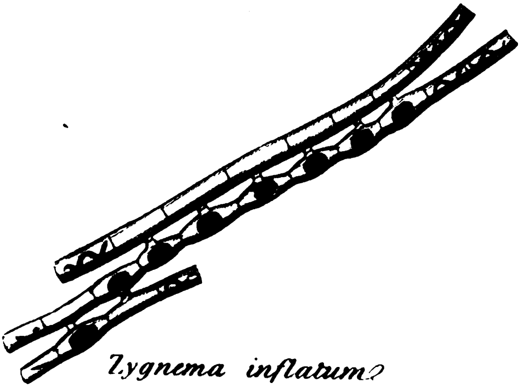
2376.

2510.



Zygnema inflatum?

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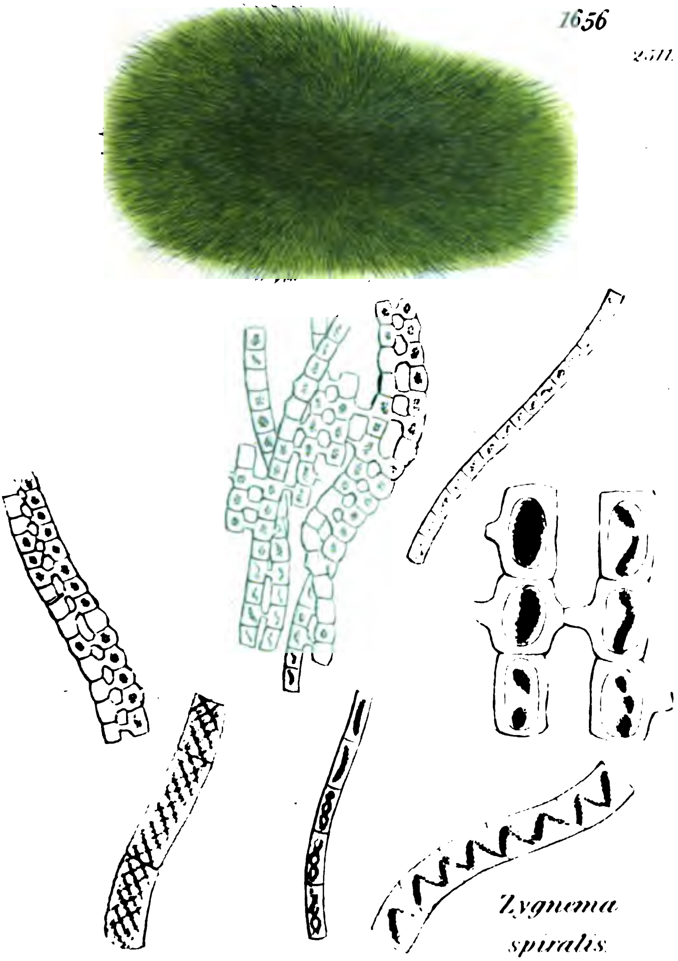
1656

2511.



Zygnema spiralis.

Oct 1 1806. Publish'd by Jas Sowerby, London

than broad, occupied internally by about eight spiral lines of green granular matter. Eventually the vesicles of parallel filaments become conjugated by laterally-protruding tubes, through which the green contents of one are conveyed to its associated neighbour, and a dense elliptical, or subglobose mass is seen in the centre of the receiving joint, the parallel one remaining empty and transparent. Sometimes this transfusion of the endochrome fails, and the articulations which do not meet with any associate become internally brown, as shown in our figure.

The other species undergo similar changes; the vesicles containing the sporidia eventually, in some instances at least, becoming disarticulated, each producing a single plant.

ZYGNEMA INFLATUM. *Inflated Zygnema.* TAB. 2510.

Dark green. Filaments simple, slender, conjugating parallelly. Articulations two or three times as long as broad, the fertile ones becoming turgid after conjugation. Endochrome forming simple (double?) spiral lines.

Conferva inflata, *E. B.* 2376. Zygnema deciminum? *Agardh Syst. Alg.* 81. *Hooker Crypt. Part* 1. 362.

I believe this figure to represent, though somewhat imperfectly, *Z. deciminum* of Agardh and Hooker, resembling that very common species in the colour and mode of conjugation of the filaments, as well as in the tumid character of the sporidia-bearing vesicles, the simple spire of the endochrome being the result of inadvertency in the delineation of the magnified figure. *Z. deciminum* often abounds in the early summer months, in the stagnant water of ditches and ponds, forming dense, cloud-like masses, of a darkish green hue: the endochrome always consisting of two spiral lines crossing each other, in some instances very regularly, so as to present "a continual multiplication of the Roman numeral X, whence the specific name." This latter character, however, becomes much confused before the time of conjugation; the spirals coalescing into a medial line retain very little of the original curvature.

The specific name by which the plant before us is designated in the first edition of English Botany is retained, in preference to the more descriptive one of *deciminum*, in consequence of the uncertainty attending its reference to that species, which I have not the means of removing by examination of the original specimen.

ZYGNEMA QUININUM. *Simple-spired Zygnema.* TAB. 2511.

Pale green. Filaments simple, slender, conjugating parallelly. Articulations twice as long as broad. Endochrome in a simple spiral.

Conferva spiralis, *Roth. Dillwyn Conf. tab.* 3. *E. B.* 1656. Zygnema quininum, *Agardh Syst. Alg.* 80. *Hooker Crypt. Part* 1. 362, *in which* Z. longatum *and* condensatum *of Agardh, and* C. longata, *Dillwyn Syn. are referred to the same species.*

Very common, especially in the early part of the summer, in ditches and ponds, forming dense masses, of a pale yellowish-green colour. Articulations variable in the young plant, but always two or three times longer than broad, contracting afterwards, as in all the species, about the time of conjugation. Spiral of the endochrome simple, regular, rather distantly coiled so as to resemble "a multiplication of the Roman numeral V."

The two magnified figures on the left hand, at the bottom of the plate, do not belong to the plant before us, probably representing portions of the fibres of *Z. deciminum*, which occasionally accompanies it.

ZYGNEMA CURVATUM. *Curved Zygnema.* TAB. **2512.**

Green. Filaments simple, very slender, here and there slightly bent, and combining by their angles. Articulations cylindrical, four or five times as long as broad. Endochrome forming a triple, irregular series of dots.

Conferva stictica, *Smith E. B.* 2463. Zygnema curvatum, *Agardh Syst. Alg.* 79. *Hooker Crypt. Part* 1. 362.

Found by Mr. Borrer in ditches in Henfield Level, Sussex. It forms large masses on the water, full of air-bubbles, being pale and yellowish above, and of a blackish-green beneath. Filaments not lubricous, nearly equalling in diameter those of *Z. nitidum*, but with much longer articulations. When young, the colour is a dull pale green, and about three imperfectly spiral lines of shining granules are with difficulty distinguishable. Afterwards these lines become more conspicuous, the rest of the filament being now perfectly colourless, and their component granules larger, but their arrangement is still irregular. The filaments subsequently unite here and there, not by every articulation, and their connecting processes are usually nearer to one end of the vesicle than to the other. Such filaments are divaricated at the points of connection, rather less abruptly than in *Mougeotia genuflexa*, Tab. 2505. In some of the combined articulations the contents appear unchanged; in others they form a mass of larger granules than in the lines; and some have a large oval sporidium, which often swells the joint. Some traces of unchanged lines occur, now and then, in the fructifying vesicles.

The upper figures on the plate, above the name, belong to the species here described, the lower ones representing *Tyndaridea cruciata.*

"This species appears to be intermediate between the genera *Mougeotia* and *Zygnema*."—*Hooker.*

The plants of this curious, and, as regards propagation, apparently isolated tribe, probably perform important offices in the economy of nature, and none more beneficial to mankind than their effect in cleansing the waters they inhabit; a function intimately connected with their development. Generated at the bottom of the stagnant pool, they rise and float upon the surface to seek the influence of the atmosphere and the light and warmth of the sun, necessary to the formation of their reproductive germs by the remarkable processes above described; when these are perfected, the cloud-like mass again sinks, to deposit them on the mud from which it rose, and on which

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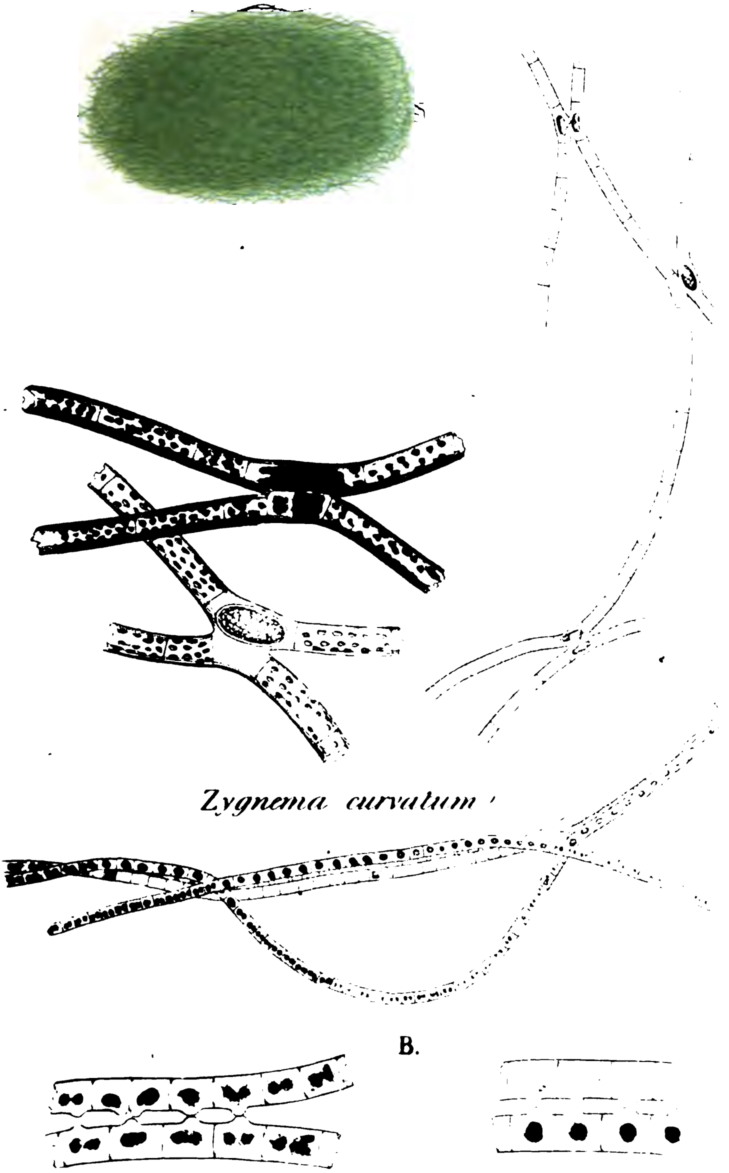
2512



Zygnema curvatum

[illegible]

they are in turn destined to vegetate; entangling and carrying down with its slimy filaments, crossing and intersecting each other like net-work, the undissolved and unappropriated remnants of putrefying animal and vegetable matter, from which such water is never wholly free: thus these little-known and neglected agents of a bountiful Providence, contribute, by simple mechanical action, to the removal of the offal that their limited power of assimilation does not admit of their consuming. Their agency is mechanical in this instance, like that of the isinglass and white-of-egg used in clarifying wine and other fermented liquors; but in the clarifying process of Nature's fluid, for the ultimate benefit of man, how many myriads of vegetable and infusorial existences, of which he has never yet had knowledge, may be concerned!—how many complicated links in the vast chain of being may be dependent upon this simple and necessary rise and fall of a *Zygnema* or *Conferva*!

TRIBE XVIII. OSCILLATORIEÆ.

Marine or fresh-water plants, consisting of simple or branched, inarticulated, continuous tubular filaments, of a green or brown, rarely purple, colour; presenting in many instances examples of spontaneous movement.

Fructification; an internal mass, or endochrome, divided by transverse septa, finally separating into roundish or lenticular sporidia.

Some of the species are scarcely aquatic, growing on damp ground, rocks, and walls, or even on decaying trees, and overrunning mosses and lichens. Of the aquatic kinds, some are remarkable as inhabiting sulphur and other mineral waters, while others grow abundantly in tepid, and even hot springs, as in those of Bath, Iceland, Switzerland, and the Pyrenees.

In burning, most of them give out a peculiar fetid odour approaching to that of animal matter; and this, together with their property of motion already referred to, renders their position in the system of nature very equivocal, although they have been hitherto almost universally regarded by naturalists as vegetables.

GENUS DCLXXVI. STIGONEMA. *Stigonema.*

GEN. CHAR. *Filaments* cylindrical, cartilaginous, branched, inârticulate; including granules arranged in transverse dotted rings.

A small genus, of which not more than two or three species are described, peculiarly charactered by the disposition of the endochrome, whence the name, from *στιγὼν*, *dotted*, and *νῆμα*, *a thread.*

Its position as a distinct genus from the next seems doubtful, from the following observations of Mr. Harvey on *S. panniforme*:—"The generic character, I am almost inclined to suspect, depends on age; for I find the apices of the branches simply striated, like a *Calothrix* or *Scytonema*, and the smaller branches, for at least part of their length, have the semipunctate appearance of *Scytonema ocellatum*; and it is only in the larger and main branches that the punctated character is clearly visible. Should my ideas prove correct, the *Stigonemæ* must only be regarded as *Scytonemæ* arrived at full perfection." *Harvey in Hooker.*

STIGONEMA ATROVIRENS. *Blackish-green Stigonema.* TAB. **2513.**

Filaments tufted; branches slightly divided, slender, attenuated, subacute; rings three-dotted.

Lichen pubescens, *E. B.* 2318. Stigonema atrovirens, *Agardh Syst. Alg.* 42. *Hooker Crypt. Part* 1. 363. Conferva atrovirens, *Dillwyn Conf. tab.* 25. Bangia atrovirens, *Lyngbye Hydroph. Dan. tab.* 25. Cornicularia pubescens, *Acharius.*

Not uncommon upon wet rocks, in alpine and subalpine districts, forming broad, rigid, loose tufts, of a greenish-black hue. Filaments variously and divaricately branched.

Our figure is very defective; it represents a tuft of the plant, and in some measure the divaricated branching of the filaments, but cannot be farther depended upon: the lichenaceous shield has certainly nothing to do with the species, but the discrepancy was unfortunately overlooked until some time after publication.

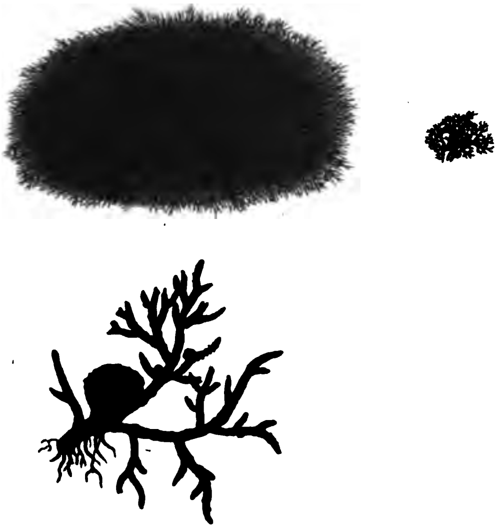
Stigonema mammillosum, of Agardh, distinguished by its simple, incrassated, fusiform, and densely mammillose branches, resembling "the pickle called girkins under the microscope," has been found growing in alpine rivulets in the north of Scotland, and in Ireland.

GENUS DCLXXVII. SCYTONEMA. *Scytonema.*

GEN. CHAR. *Filaments* destitute of a mucous layer, branched, rarely simple, continuous, tubular, flaccid, subcoriaceous. *Endochrome* brown or olivaceous, transversely striated, eventually separating, at the striæ, into annuliform or lenticular sporidia.

The probable identity of this genus with the last has been already noticed; the species of both are nearly allied to those of *Calothrix* and *Lyngbya*, and indeed are scarcely distinguish-

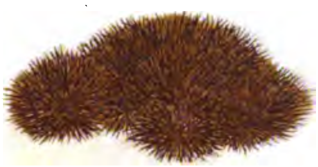
2318.
2513

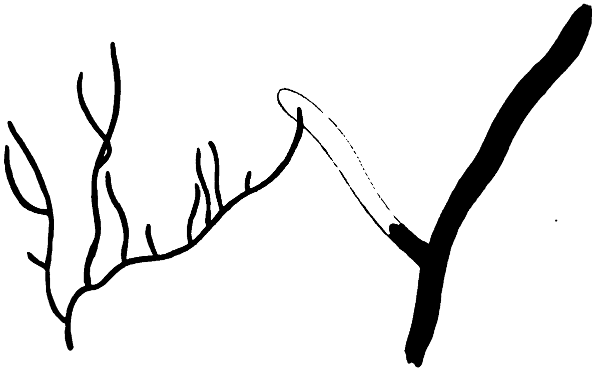


Stigonema atrovirens.

Aug. 1 [illegible] published by Jas. Sowerby London

2530.
2514.





Scytonema ocellatum ?

Apl 1 1813 published by Jas Sowerby London

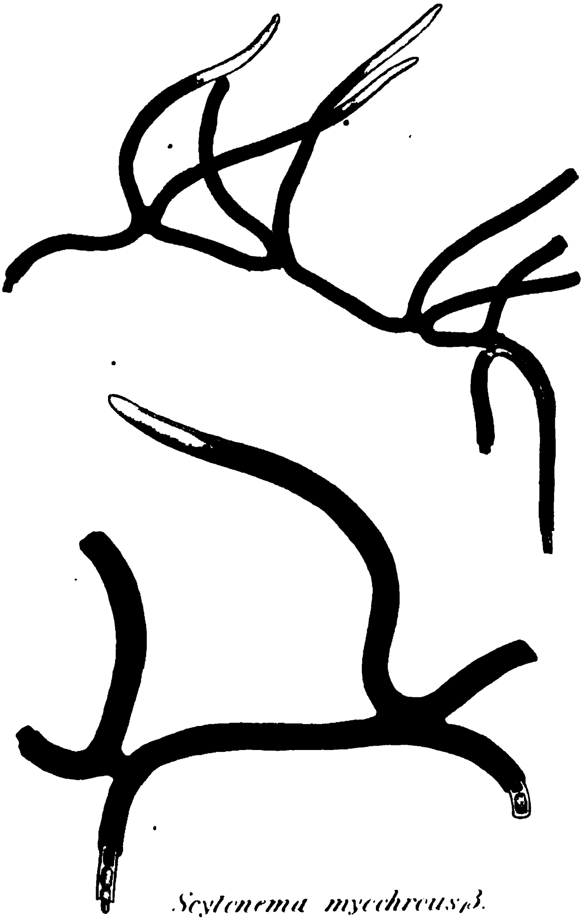
1555
2575

Scytonema myochrous.

[illegible]

2219

[illegible]



Scytonema mycochrous β.

[illegible]

able from the first, unless by the colour of the endochrome. Named from σκύτος, *a skin*, and νῆμα, *a thread*, from the skin-like texture of the filaments.

Eight British species of the genus have been described.

SCYTONEMA OCELLATUM. *Bearded Scytonema.* TAB. 2514.

Filaments elongated, gelatinous, pale brown, flexuose; branches obtuse, slightly contracted at the base, divaricated.

Conferva ocellata, *Dillwyn Conf. Syn.* 60. *tab. D. E. B.* 2530. Scytonema ocellatum, *Harvey in Hooker Crypt. Part* 1. 364. S. myochrous, *β*. ocellatum, *Agardh Syst. Alg.* 40.

Found on bogs and wet moors in alpine districts, forming dense, tufted masses, of a dull yellowish-brown colour. Filaments erect or subdecumbent, gelatinous, irregularly branched; branches erecto-patent, subsolitary, simple, or with a few short ramuli, very obtuse. Substance thick, the tube or cavity not occupying more than half of the diameter of the filament or its branches. Sporidia eventually spherical, and finally longitudinally divided into two portions.

SCYTONEMA MYOCHROUS. *Mouse-skin Scytonema.* TAB. 2515 and 2516.

Filaments elongated, mostly decumbent, subrigid, flexuose, slender, brown. Branches in pairs at right angles with the stem.

Conferva myochrous, *Dillwyn Conf. tab.* 19. *E. B.* 1555, and C. mirabilis, *E. B.* 2219 (according to Mr. Harvey). Scytonema myochrous, *Agardh Syst. Alg.* 40. *Lyngbye Hydroph. Dan. tab.* 27. *Hooker Crypt. Part* 1. 365. S. ocellatum, *Lyngb. Hydroph. Dan. tab.* 28.

Not uncommon, growing on stones in alpine torrents, and, if *C. mirabilis* of our first edition be the same species, overgrowing mosses in bogs. Filaments decumbent, flexuose, closely interwoven into a dark brown stratum.

"The manner in which the branches are given off in this species is very curious, and quite unlike what takes place in *S. ocellatum.* At first sight, they appear to be *appositional*, or resulting merely from the lateral coherence of two simple filaments. This, however, is not the case, as is proved by the tube above and below the point of ramification being continuous and unbroken, *at the opposite side* from the branches, as well as by tracing the various stages of the plant with a good microscope. The threads are at first *simple* continuous tubes, containing a coloured sporaceous mass, which is closely marked with transverse striæ, and broken, as if by dissepiments, at uncertain distances. Opposite these dissepiments a rupture eventually takes place on one side of the sheath of the tube, and the *endochrome* issues in two columns, at first resembling mammillæ, but finally elongating into branches."—*Harvey in Hooker.*

Mr. Harvey's reference of *C. mirabilis* of Sir J. E. Smith to this species, is founded on examination of the original specimens forwarded by Miss Hutchins from the neighbourhood of Bantry, Ireland, and from which Mr. Sowerby's figure was taken; the accomplished author of 'English Botany' having erred in his description and synonym, supposing them collected in Bantry Bay, and consequently a submarine species. Their attachment to a moss, some species of *Orthotrichum*, clearly establishes their freshwater locality.

Some trace of the curious development of the branches, so circumstantially detailed by Mr. Harvey, may be observed in the upper magnified figure of Tab. 2516, but the drawing has evidently been guided by the supposition of the filaments cohering in the manner of those of the *Tyndarideæ*.

SCYTONEMA TURFACEUM. *Peat Scytonema.* TAB. **2517.**

Filaments abbreviated, proliferous golden yellow-brown, obtuse. Sporidia finally green.

Scytonema turfaceum, *Berkeley in E. B. Supp.* 2826. *fig.* 1. Dematium turfaceum, *Persoon Myc. Eur.* 1. 69. *Link Sp. Pl.* 1. 134.

Found by Dr. Greville on the Pentland Hills, overrunning heath, sphagnum, &c., forming a short, brownish, shaggy stratum. Filaments suberect, giving out in a proliferous manner short, very obtuse branches of a beautiful golden yellow-brown; two sometimes springing from the same point, and probably originating like those of *S. myochrous*. Substance of the filaments very thick. Sporidia annuliform, green, composed of a compact grumous mass, or divided, especially in the older filaments, into a single row of distinct oblong granules.

GENUS DCLXXVIII. CALOTHRIX. *Calothrix.*

GEN. CHAR. *Filaments* destitute of a mucous layer, erect, tufted or fasciculate, fixed at the base, somewhat rigid, continuous, tubular. *Endochrome* green, densely annulated, eventually separating into annular or lenticular sporidia.

The genus is not very well defined, being chiefly distinguished, in the above character, from *Scytonema* by the green colour of the endochrome, a feature far from universal in the species at present referred to it: these, however, present such considerable difference in habit, that the rudiments of two genera at least are probably included under this title, derived from *καλὸς*, *beautiful*, and *θρὶξ*, *a hair*, in allusion to the very slender and delicate appearance of the filaments.

Thirteen species are described as indigenous to this country, but only four have hitherto been figured in 'English Botany;' these, however, afford examples of the difference of habit and locality which the genus presents.

CALOTHRIX CONFERVICOLA. *Glaucous parasitical Calothrix.* TAB. **2518.**

Filaments glaucous-green, minute, erect, simple, subulate, rigid, fasciculate.

2826.
2517.

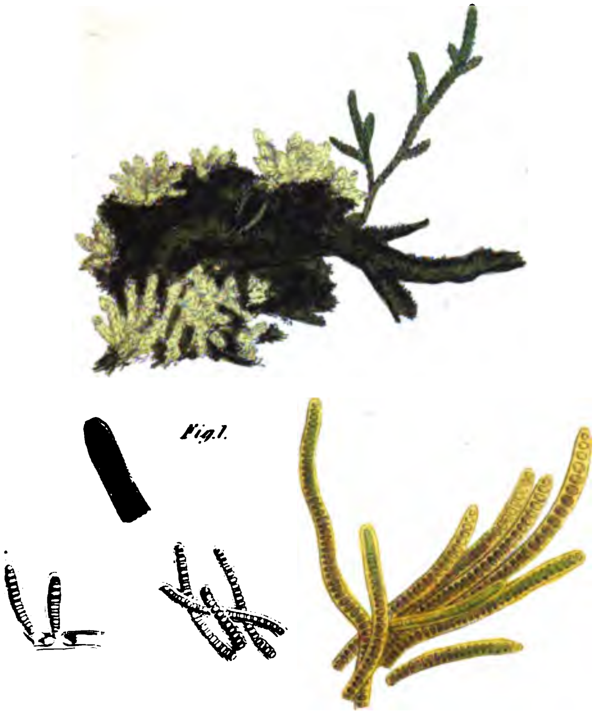


Fig. 1.

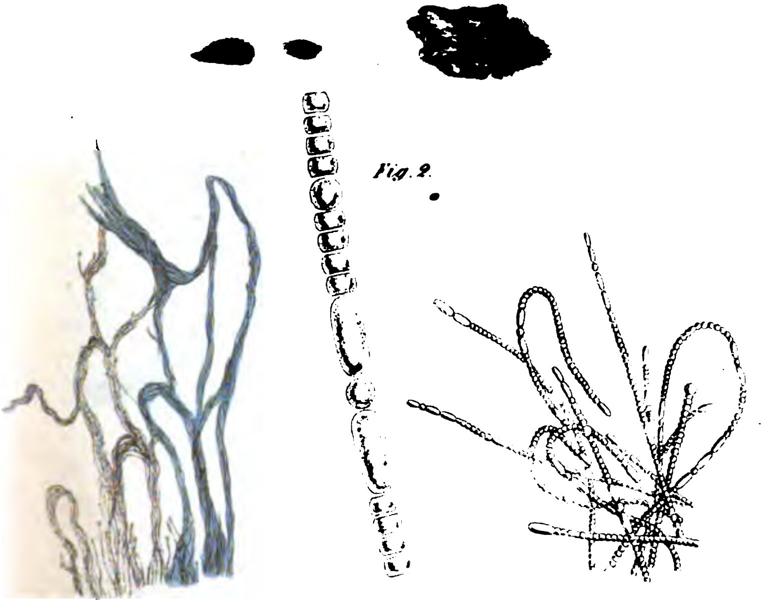
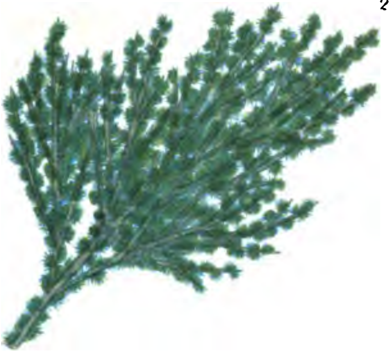
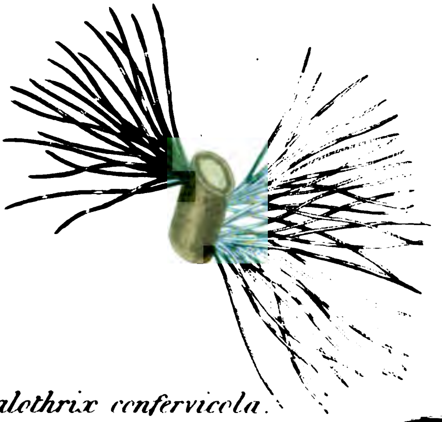


Fig. 2.

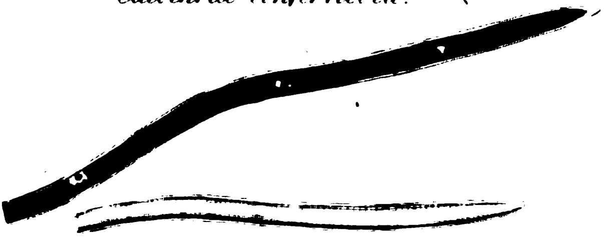
Scytonema turfaceum — Fig 1.
Sphærozyga Jacobi — Fig 2.
Septr. 1st 1838.

2576.
2518.





Calothrix confervicola.



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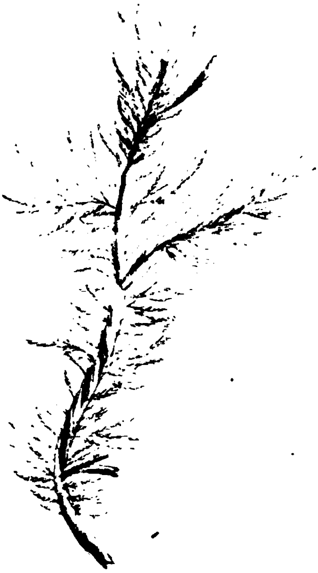
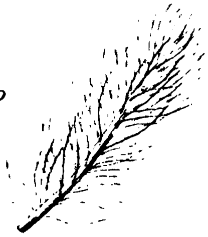
2529.
2519.

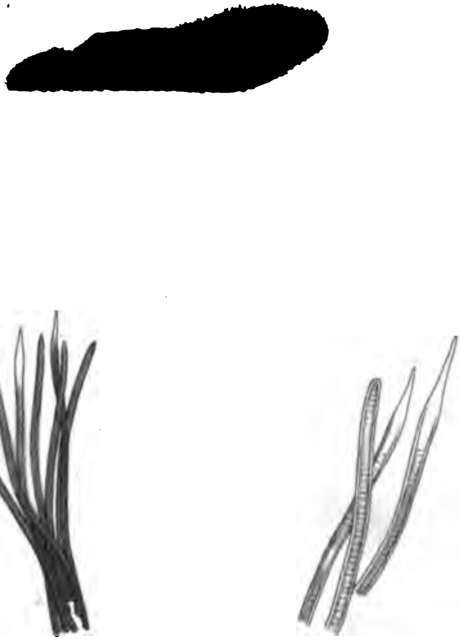


Calothrix nivea.



Apl 1 [illegible] published by Jas Sowerby London

2171
2520.

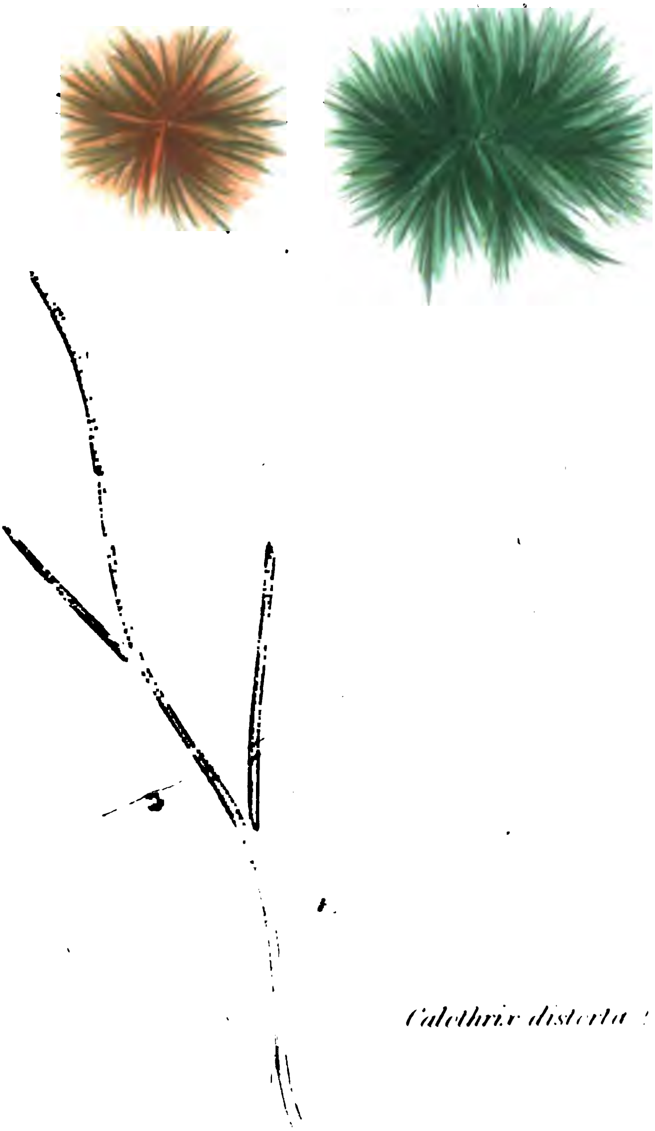


Calothrix scopulorum?

July 1 1810 published by Jas. Sowerby London

2577

2521



Calothrix distorta !

[illegible]

Conferva confervicola, *Dillwyn Conf. tab.* 8, *and Supp. tab. A. E. B.* 2576. Calothrix confervicola, *Agardh Syst. Alg.* 70. *Hooker Crypt. Part* 1. 367.

A common parasite on many of the filamentous marine Algæ, on which it forms little pencil-like tufts of a glaucous-green colour, which are often so numerous and closely set as completely to conceal the supporting plant. Filaments seldom more than an eighth or tenth of an inch long, tapering at the upex. Endochrome eventually "consolidated into lenticular sporidia, which escape at the end of the tube, either singly or cohering in short cylinders."—*Carmichael in Hooker.*

CALOTHRIX NIVEA. *White Calothrix.* TAB. **2519.**

Filaments whitish, minute, extremely slender, somewhat rigid, forming continuous tufts.

Conferva nivea, *Dillwyn Conf. Syn. tab. C. E. B.* 2529. Calothrix nivea, *Agardh Syst. Alg.* 70. *Hooker Crypt. Part* 1. 367.

Found only in sulphur springs in Yorkshire and Durham, generally growing on roots and decaying leaves; the specimen figured was forwarded from that at Middleton, near Darlington, and, as observed by Dr. Willan, the species is not found below the spring farther than where the water retains sensible sulphureous qualities, as though "the hepatic gas were necessary to its production and nourishment." The filaments are more or less incrusted with an earthy matter, which conceals the dark, annular endochrome, and gives the tufts a dirty yellowish appearance.

CALOTHRIX SCOPULORUM. *Green Plush Calothrix.* TAB. **2520.**

Filaments minute, simple, nearly erect, curved, flexuose, attenuated above; agglutinated at the base, forming a continuous, dark-green, velvety stratum.

Conferva scopulorum, *Weber and Mohr. Dillwyn Conf. Syn. tab. A. E.B.* 2171. Calothrix scopulorum, *Agardh Syst. Alg.* 70. *Hooker Crypt. Part* 1. 368.

Common on rocks and on wood-work in the sea, especially about high-water mark, forming dark green, slippery patches, resembling plush or coarse velvet, and consisting of innumerable simple filaments, from a tenth to an eighth of an inch in height, nearly erect, but more or less curved and flexuose, tapering and pellucid at the apex, and sometimes slightly tumid a little below; very glutinous and cohering at the base. When dry they adhere in curved, clotted tufts.

C. fasciculata of Agardh, distinguished by its longer, more truly erect, and pseudo-branched filaments, can scarcely be other than a luxuriant variety of this, growing in deeper water. The species is very variable in the size, colour, and attenuation of the filaments.

CALOTHRIX DISTORTA. *Twisted-branched Calothrix.* TAB. **2521.**

Filaments elongated, pseudo-branched, mucous, somewhat rigid;

forming tufts of a bluish-or glaucous-green colour. Branches suberect, flexuose.

Conferva distorta, *Dillwyn Conf. tab.* 22, and *Supp. tab. A.* *E. B.* 2577. Calothrix distorta, *Agardh Syst. Alg.* 72. *Hooker Crypt. Part* 1. 369.

Found occasionally in boggy pools, growing in thick continuous tufts, on decaying grass and about the stems of aquatic plants, upon small fragments of which it often floats in the autumn on the surface of the water. The colour when fresh is a darkish green, with a glaucous or verdigris tinge, which becomes more remarkable in drying. When long exposed to the air, it assumes a tawny brown hue. Filaments from half an inch to an inch in height, very slender, curved, and tortuous, more or less pseudo-branched, or appositionally so, somewhat fasciculate.

Our magnified figure is much at variance with the opinion of Mr. Dillwyn and others, respecting the branched character of the filaments being only apparent, and resulting from their cohesion or apposition with each other; indeed, it presents a very close illustration of the remarkable mode of branching by the effusion of the endochrome, in plants of this tribe, as observed by Mr. Harvey, and so circumstantially described by him, in *Scytonema myochrous.*

I am very doubtful whether *Calothrix mirabilis* of Agardh, *Conferva mirabilis,* Dillwyn Conf. tab. 96, be really distinct from this, though somewhat differing in habit, and in its smaller size.

GENUS DCLXXIX. LYNGBYA. *Lyngbya.*

GEN. CHAR. *Filaments* destitute of a mucous layer, free, flexible, elongated, continuous, tubular, decumbent. *Endochrome* green or purple, densely annulated, eventually separating into lenticular sporidia.

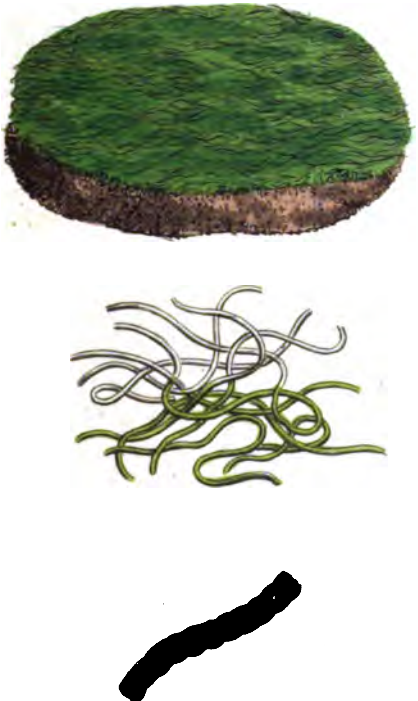
Except from a difference in habit, chiefly resulting from the filaments being decumbent instead of erect, the plants of this genus might be referred to the preceding. Named by Agardh in honour of H. C. Lyngbye, a Danish botanist, the author of a valuable work on the Algæ of Denmark, frequently noticed in our synonyms. Six species have been found in Britain, of which *L. muralis* is terrestrial, or rather aërial: *L. prolifica* forms floating strata on fresh water, and *L. majuscula*, *L. ferruginea*, *L. Carmichaelii*, and *L. speciosa* grow in the sea, or in salt-water pools and ditches. The first only is figured in this work, the others, *L. majuscula* perhaps excepted, being very rare, or hitherto little observed.

LYNGBYA MURALIS. *Green wall Lyngbya.* TAB. **2522.**

Filaments somewhat rigid, thickish, tortuous, interwoven into a bright grass-green stratum.

1554

2522.



Lyngbya muralis.

Jan. 1. 1806 Published by Jas. Sowerby London

Conferva muralis, *Dillwyn Conf. tab.* 6. *E. B.* 1554. Lyngbya muralis, *Agardh Syst. Alg.* 74. *Hooker Crypt. Part* I. 370.

Very common on damp walls, stones, and neglected shady gravelled walks. It is as frequently met with in damp areas in London and other large towns as elsewhere, and is very conspicuous in wet weather, especially in the winter half-year, from its bright but dark-green, velvety appearance. The filaments are simple, curving in various directions, and densely twisted and entangled together, forming patches of various extent.

LYNGBYA MAJUSCULA. *Large Lyngbya.*

Filaments very thick, issuing in long, crisped bundles, from a blackish-green stratum, tortuous, simple.

Conferva majuscula, *Dillwyn Conf. Supp. tab. A.* Lyngbya majuscula, *Harvey in Hooker Crypt. Part* I. 370.

Found on several parts of the southern coast of England, and in Bantry Bay, Ireland. Filaments forming blackish-green interwoven strata, from which they issue in crisped bundles, an inch or two in length; sometimes agglutinated together so as to appear branched.

GENUS DCLXXX. OSCILLATORIA. *Oscillatoria.*

GEN. CHAR. *Filaments* simple, acicular, rigid, elastic, continuous, tubular; radiating from, and sometimes invested by, a mucous matrix; oscillating. *Endochrome* divided by close, parallel, transverse striæ.

A very extensive genus, of which between twenty and thirty species have been described as British; many of these, however, are at present involved in much uncertainty, on account of the difficulty of framing specific distinctions, where the individuals present scarcely any other observable character than that of general habit or external appearance. The curious oscillating motion of the filaments, whence the generic name is derived, constitutes the most marked feature of the genus, as distinct from the preceding ones of its tribe, with which, however, I believe it to have no real affinity: the mucous stratum or layer, from which they appear to emanate, is simply the result of the successive decay of their progenitors, and their propagation, in the only two species in which I have had opportunity of observing it, is very different from that of *Calothrix* and its allies, the threads appearing to be formed within the tube, by longitudinal separation of the endochrome, instead of growing or elongating from annular or lenticular sporidia. There appears in this mode of multiplication something more analogous to that of some *Polypiaria* than of a true vegetable production, which, added to the exceedingly active vibrations of some species, that seem to be incessant during the short existence of the individual, renders their position between the two kingdoms of organic being very equivocal. The observations of Captain Carmichael, as quoted by Mr. Harvey from his unpublished 'Algæ Appinenses,' accord so nearly with my own views of the *Oscillatoriæ*, that I am induced to copy the extract: though rather too lengthy for the plan of our work, it can scarcely be otherwise than interesting to those readers who have been hitherto unacquainted with the habits of these curious existences.

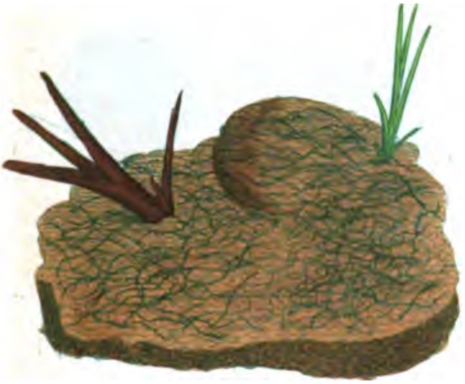
"I have been induced to bestow considerable attention on such of the species as fell under my notice, on account of the singular motion remarked in the filaments by various naturalists; and I do confess, that the result is something like conviction that they belong rather to the animal than to the vegetable kingdom. This motion or oscillation has been attributed to various causes; to the rapidity of growth, to the action of light, or to the agitation of the water in which the specimens were immersed for inspection; but none of these affords a satisfactory explanation; the last may be put to the proof by a very simple contrivance. Let a small portion of the stratum be placed in a watch-glass nearly filled with water, and covered with a circular film of talc, so that its edge may touch the glass; the water will be rendered as fixed as if it was a piece of ice. The glass may now be placed under the microscope, and the oscillation of the filaments viewed without any risk of disturbance from the agitation of the water; by following this course, it will be speedily perceived that the motion in question is entirely independent of that cause.

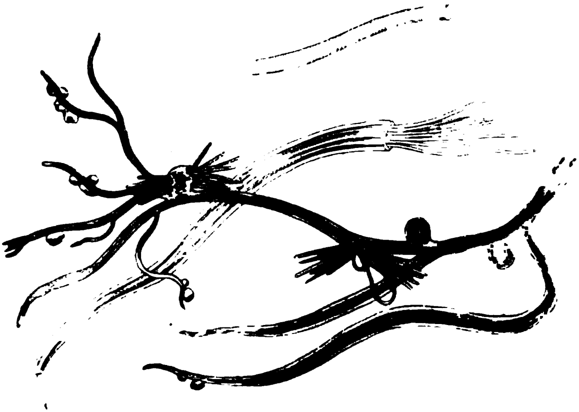
"The action of light, as a cause of motion, cannot be directly disproved, because we cannot view our specimens in the dark; but indirectly there is nothing easier. If a watch-glass, charged as above, be laid aside for a night, it will be found, that by the next morning, not only a considerable radiation has taken place, but that multitudes of the filaments have entirely escaped from the stratum; both indicating motion independent of light. Rapidity of growth will show itself in a prolongation of the filaments, but will not account for this oscillation to the right and left; and still less for their travelling, in the course of a few hours, to the distance of ten times their own length from the stratum. This last is a kind of motion, unexampled, I believe, in the vegetable kingdom.

"There is another point in the natural history of the *Oscillatoriæ*, which favours the opinion that they are animalcules. It is the extremely limited term of their existence. The community, if I may so call it, lives for several months; but

1995

2523.



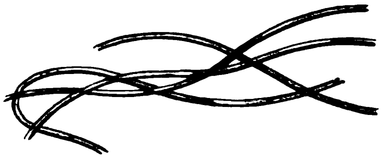


Oscillatoria chthonoplastes.

Mar 1 1809 Publish'd by Jas Sowerby London.

258+
2524.

Oscillatoria tenuissima.



the individuals die off, and are succeeded by others with a rapidity to which there is no parallel among genuine plants. If a small portion of stratum, say one fourth of an inch in diameter, be left for three or four days, in a watch-glass filled with water, the whole area of the glass will be found covered with a thin transparent pellicle or incipient stratum, derived from the filaments that had successively radiated and died in the course of that short period."

The *Oscillatoriæ* affect various habitats, some of them forming extensive strata, often several feet in diameter, on damp ground and walls, others growing in standing or running waters, and a few on muddy sea-shores. Only five of them are figured in the "English Botany," but several others are of common occurrence.

OSCILLATORIA CHTHONOPLASTES. *Sheathing Oscillatoria.* TAB. **2523.**

Stratum glaucous-green. Filaments parallel, penicillate from the apex of the decumbent, elongated, flexuose, sheath-like fascicles.

Conferva vaginata, *Dillwyn Conf. tab.* 99? *E. B.* 1995. Oscillatoria chthonoplastes, *Hoffmann. Lyngbye Hydroph. Dan. tab.* 27. *Agardh Syst. Alg.* 62. *Hooker Crypt. Part* 1. 373. Oscillatoria vaginata, *Vaucher Conf.* 200. *tab.* 15. *fig.* 13.

Found on the ground by road-sides and footpaths, and far from unfrequently, forming a thin, slimy stratum, composed of glutinous, decumbent, variously entangled, pellucid sheaths, investing numerous dull green filaments, that radiate from their apices in a more or less penicillate manner.

The sheaths have always appeared to me to be the remains of previously formed filaments, in a state of incipient decay. The little globular bodies here and there attached, in our magnified figure, I have never met with, but in the original description they are stated to contain coiled filaments.

OSCILLATORIA TENUISSIMA. *Slender warm-spring Oscillatoria.* TAB. **2524.**

Dark green, ascending, tufted. Filaments simple, cylindrical, even, without any visible annuli.

Oscillatoria tenuissima, *Agardh Syst. Alg.* 62. *Hooker Crypt. Part* 1. 373. Conferva tenuissima, *Smith E. B.* 2584.

First found by the Rev. Dr. Davies, in the celebrated warm waters of Bath, spreading rather unequally, in broad velvet-like patches, of a dark green colour. The irregularity of its appearance arises from the filaments being collected together into little ascending tufts, apparently rooted in the muddy deposit of the water. Each tuft proves, on examination, to consist of simple, uniform, even filaments, crowded together, quite pellucid, and equally destitute of joints and branches. Their diameter is not more than an eight or ten-thousandth part of an inch.

OSCILLATORIA TENUIS. *Lesser Mud Oscillatoria.* TAB. 2525.

Stratum rich dark-green, very thin, gelatinous, with short rays. Filaments pale green, straight and rigid; striæ distant, not strongly marked.

Conferva limosa, *Dillwyn Conf. tab.* 20. *E. B.* 2053. Oscillatoria tenuis, *Agardh Syst. Alg.* 65. *Hooker Crypt. Part* 1. 374. *Greville Fl. Edin.* O. limosa, *Hooker Scot.* 2. 79.

Not uncommon in ditches, drains, and slow running waters with a muddy bottom, over which it forms a soft mucous mass, sometimes rising and floating on the surface, apparently borne up by bubbles of gas generated beneath the stratum. Filaments very slender, about a quarter of an inch in length, pale green; very distantly and indistinctly striated.

In the original description of this species by Sir. J. E. Smith, there appears a tendency to confound it with the following, especially in regard to the colour of the filaments being a "dark blueish-green;" but the magnified figures certainly accord more nearly, in the distance of the striæ, with the present, to which, with some diffidence, I have referred the plate.

OSCILLATORIA LIMOSA. *Greater Mud Oscillatoria.*

Stratum rich dark-green, glossy, gelatinous, with long rays. Filaments green, straight and rigid, thick; striæ strongly marked and very closely set.

Oscillatoria limosa, *Agardh Syst. Alg.* 66. *Hooker Crypt. Part* 1. 374. (*Not of Greville Fl. Edin. nor Hooker Scot. nor* Conferva limosa *of Dillwyn and E. B.* ?)

Perhaps not unfrequent in ditches and ponds, forming denser strata than those of *O. tenuis*, from which it essentially differs in the deeper æruginose-green colour of the filaments, their greater length and thickness, and the very distinct and closely-set striæ. Both of the species are of very rapid growth, and exhibit the oscillatory movement equally energetically. Both adhere closely to paper in drying, retaining their colour and gloss.

OSCILLATORIA CYANEA. *Blueish Wall Oscillatoria.* TAB. 2526.

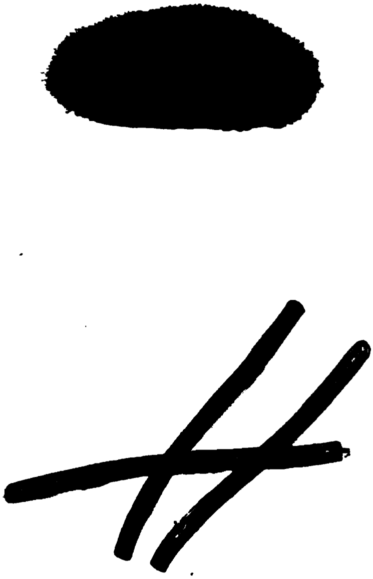
Stratum glaucous-blue. Filaments simple, entangled, cylindrical, even, with a deciduous coat; obsoletely striated at distances about equal to their diameter.

Conferva cyanea, *Smith E. B.* 2578. Oscillatoria cyanea, *Agardh Syst. Alg.* 68. *Hooker Crypt. Part* 1. 374.

First observed by Sir Thomas Gage, Bart. growing on damp walls on the inside of several churches in Suffolk, as at Icklingham and Hengrave; also in Lancashire. On the wall it is conspicuous for its light sky-blue colour, like some sort of *Mucor*. Under a high magnifier, and moistened, it is found to consist of minute, even, simple, entangled filaments, about the 500th part of an inch in diameter, coated with a frequently interrupted covering, of a dull glaucous-green hue, under which the filament itself appears of a lighter glaucous

2053.

2525.

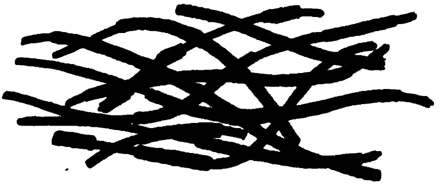


Oscillatoria limosa.

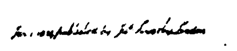
May 1 1809 published by Jas. Sowerby London.

257

2526.



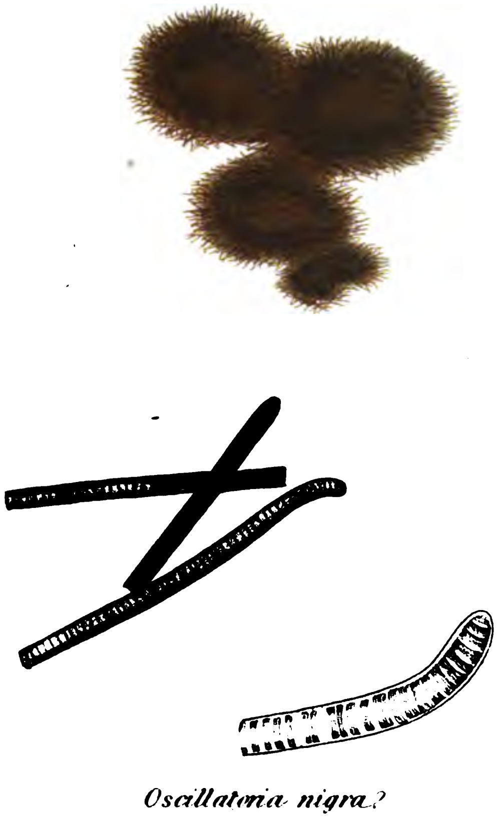
Oscillatoria cyanea?



Jan. 1 [illegible] published by Ja.s Sowerby London

2254.

2527.



Oscillatoria nigra?

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blueish colour, very even in thickness and surface, marked with scarcely distinguishable, rather closely-set striæ.

OSCILLATORIA NIGRA. *Blackish Oscillatoria.* TAB. 2527.

Stratum blackish-green, with long radii. Filaments pale blueish-green, thick. Striæ very distinct and close.

Conferva fontinalis, *Dillwyn Conf. tab.* 64. *E. B.* 2054? Oscillatoria nigra, *Vaucher. Agardh Syst. Alg.* 63. *Hooker Crypt. Part* 1. 376. O. limosa, *Greville Fl. Edin.*

Common in ditches and other stagnant waters, forming extensive greenish-black strata, which eventually rise and float on the surface. Filaments elongated, obtuse, thickish, very distinctly and closely striated, their oscillating movements generally very quick and constant.

I believe myself correct in referring our figure of *Conferva fontinalis* to this species: in regard to colour, I fear that too much dependence is often placed upon the very fugitive characters it yields, in discriminating between the species of these lower grades of vegetation; certain it is, that *O. nigra* is liable to exchange its blackish for a brownish hue in some situations, under which circumstance, the figures before us will afford a very near representation of the species in question.

Mr. Harvey observes that "Dillwyn's figure of *Conferva fontinalis* answers this species pretty correctly, but his description seems to take in many others."—*Hooker Crypt.*

Other species more or less frequent are—

O. decorticans. Stratum smooth, glaucous-green, membranaceous. Filaments very slender, curved, pale blueish-green. Striæ distant. Conferva decorticans, *Dillwyn Conf. tab.* 26. Oscillatoria decorticans, *Greville Fl. Edin. Hooker Crypt. Part* 1. 375.
Occasionally met with on damp walls, decaying timber, &c.

O. autumnalis. Stratum purplish or greenish-black, very lubricous, shortly radiating. Filaments pale blueish-green. Striæ subdistant. Oscillatoria autumnalis, *Agardh Syst. Alg.* 62. *Hooker Crypt. Part* 1. 376.
Frequent on damp walls in the winter half-year; forming extensive, dark-green or purplish, lubricous strata.

O. Corium. Stratum thick, subcoriaceous, opaque, dull brownish, streaked with pale green. Filaments yellowish, slender. Striæ indistinct, distant.
Oscillatoria Corium, *Agardh Syst. Alg.* 64. *Hooker Crypt. Part* 1. 377.
Forms a thick, tough, brownish stratum on the rocky beds of alpine rivulets. Nearly allied to it, if not another state of the same, chiefly differing in its more gelatinous, and less tough or leather-like texture, is *O. subfusca, Vaucher. Lyngbye Hydroph. Dan. tab.* 26.

O. ochracea. Stratum floating, very fragile, ochrey. Filaments scattered, very slender, acicular.

Conferva ochracea, *Dillwyn Conf. tab.* 62. Oscillatoria ochracea, *Greville Fl. Edin. Hooker Crypt. Part* 1. 378.

Forms cloud-like, floating masses in boggy pools. A very indefinite species.

TRIBE XIX. BYSSOIDEÆ.

Filaments articulated, hyaline, or coloured. Fructification: granules scattered among the filaments, or thecæ.

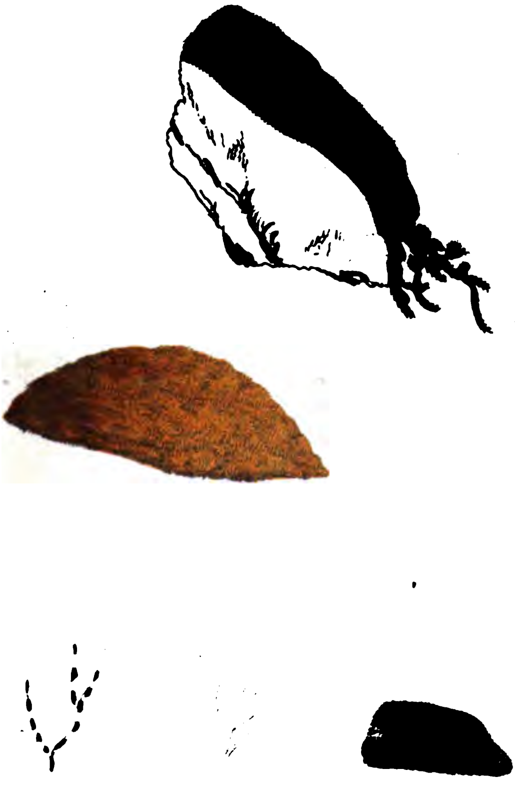
The plants of this tribe are of very doubtful character. The greater number are closely allied to the *Fungi*; this is especially the case with the genus *Mycinema*, whose species, cobweb-like, and variously coloured, grow on rotten wood; with *Hygrocrocis*, consisting of various filamentous, subgelatinous and pellicle-like productions, vegetating in stale infusions, ink, wine, and even in some chemical solutions exposed to the air; with *Byssocladium*, &c.: while others have been suspected to be only modifications of plants of higher organization, or in an incipient state of growth.

Of the three genera above named, our work does not contain any figures. *Byssocladium fenestrale*, however, is a very common production, in the form of roundish white spots on neglected windows, in damp weather and shaded situations, even in secluded courts and areas in the centre of large towns. The spots, when examined with a microscope, are seen to consist of numerous very slender articulated filaments, radiating from a central point, with a more or less powdery appearance, in consequence of minute granules adhering to them externally, and constituting probably the media of reproduction. It is the *Conferva fenestralis*, Dillwyn Conf. tab. 94.

The species of *Hygrocrocis* are probably as numerous as the liquids in which they are generated; they are collectively distinguished as composed of transparent filaments variously interwoven, sometimes forming an uniform membrane, sometimes a gelatinous mass: the most common example is *H. Atramenti*, which forms the white, mould-like stratum on the surface of ink: *H. Rosæ* is seen in beautiful roundish tufts that form in the rose-water of the chemists when left exposed.

GENUS DCLXXXI. CHROOLEPUS. *Chroolepus.*

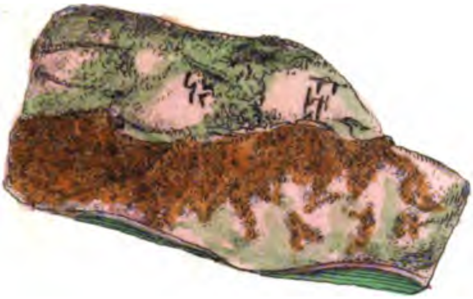
GEN. CHAR. *Filaments* rigid, subsolid, opaque, falling to powder, erect, minute; often contracted at the joints.



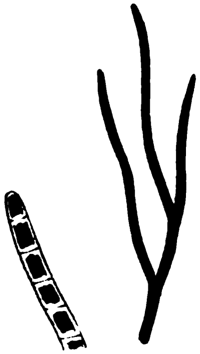
Chroolepus aureus.

1639

2529.



Chroolepus iticicola?



Sept.1.1844. Publish'd by Ja.s Sowerby, London.

Of the fungoid character of the species referred to this genus there can scarcely be question: but in approaching towards the conclusion of our work, we have long since left behind us, in the simple cellular structure of the *Confervæ*, properly so called, and their near allies, all the more positive features of the vegetable organization; and are now involved among those obscure productions, which, occupying the verge of the two kingdoms of vitality, seem to defy the utmost efforts of the naturalist to arrange and classify.

The name, from *χρόος, a skin,* and *λέπω, to peel or decorticate,* probably alludes to the deciduous powdery surface of the filaments.

CHROOLEPUS AUREUS. *Orange Chroolepus.* TAB. **2528.**

Filaments forming soft, cushion-like tufts, flexuose, irregularly branched, yellow-green or orange-coloured. Articulations twice as long as broad.

Byssus aurea, *Linn.* *E. B.* 212. Chroolepus aureus, *Harvey, Hooker Crypt. Part* 1. 380. Trentepohlia aurea, *Agardh Syst. Alg.* 36. Conferva aurea, *Dillwyn Conf. tab.* 35. Ectocarpus aureus, *Lyngbye Hydroph. Dan. tab.* 44. Amphiconium aureum, *Sprengel.*

Common on rocks, old buildings in damp situations, in chalk-pits, and occasionally on trees. It often covers a space of many inches in diameter, looking like a piece of orange-coloured cloth or velvet; sometimes the surface is more tufted, broken and irregular, and it frequently grows in a straggling manner over mosses. When of any considerable size, it is a very conspicuous and beautiful object. Its fine colour, however, is not permanent, changing, when perfectly dry, to a dull greenish-grey.

The crust formed by it is often an eighth of an inch in thickness, appearing to spread concentrically.

CHROOLEPUS ILICICOLUS. *Yellow Holly Chroolepus.* TAB. **2529.**

Filaments erect, alternately branched, forming tufts of a permanent tawny-yellow. Articulations nearly as long as broad.

Conferva ilicicola, *E. B.* 1639. Chroolepus aureus, *Harvey, Hooker Crypt. Part* 1. 380.

Found by Mr. Lyell on the smooth bark of hollies in the New Forest, in the spring. Sometimes it invests specimens of *Thelotrema lepadinum.*

CHROOLEPUS JOLITHUS. *Orange-red Chroolepus.*

Filaments tufted, erect, very short, dichotomous, orange-red. Articulations once and a half as long as broad.

Chroolepus jolithus, *Agardh Syst. Alg.* 34. *Hooker Crypt. Part* 1. 380.

Found on rocks, trees, &c. Both this and *C. ilicicolus* seem to be mere varieties of *C. aureus*, differing chiefly in hue and in the shorter articulations.

CHROOLEPUS LICHENICOLUS. *Red Lichen Chroolepus.* TAB. 2530.

Tufts orange-red. Filaments erect, fasciculated, rigid, alternately branched. Articulations slightly tumid, as long as broad.
Conferva lichenicola, *E. B.* 1609. *Dillwyn Syn. Conf.* 56. Chroolepus lichenicolus, *Agardh Syst. Alg.* 35. *Hooker Crypt. Part* I. 381.

Not unfrequent on old trees, growing parasitically on *Lecanora Turneri*, *Thelotrema lepadinum*, and other crustaceous Lichens, and appearing to the naked eye like brick-dust scattered over them. Filaments erect, forming thick tufts, of an orange-red or brownish colour, which under a moderate magnifier look like velvet, but without any silky gloss.

CHROOLEPUS EBENEUS. *Black Chroolepus.* TAB. 2531.

Filaments tufted, erect, rigid, branched, obtuse, black. Articulations as long as broad.
Byssus nigra, *Hudson.* *E. B.* 702. Conferva ebenea, *Dillwyn Conf. tab.* 101. Chroolepus ebeneus, *Agardh Syst. Alg.* 36. *Hooker Crypt. Part* I. 381.

Far from unfrequent in mountainous and subalpine districts, growing in shady spots on the rocks, and sometimes on trees. It forms thin patches of indefinite extent, of a deep black hue. When scraped from the stone, it closely resembles a piece of felt scraped from a hat, both in texture and appearance, consisting of a mat of fine, elastic, fragile, branched filaments, often covered with a black, soot-like powder. The articulations are slightly translucent.

"I have found specimens of this plant, bearing *pod-shaped branches or appendages*, thicker than the main filament, with the articulations twice as broad as long, and readily separating."—*Carmichael in Hooker.*

"These *pod-shaped appendages* are surely of the same nature as what are called *sporidia* in the genus *Helmisporium* of Link; to which genus the *black* species of *Chroolepus* ought, perhaps, to be removed." —*Harvey.*

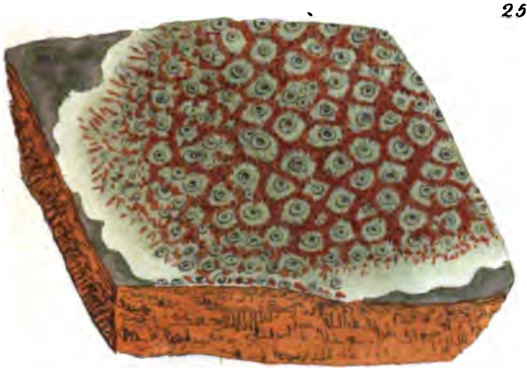
GENUS DCLXXXII. TRENTEPOHLIA. *Trentepohlia.*

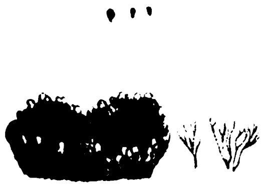
GEN. CHAR. *Filaments* minute, tufted, erect, coloured, articulated; dissepiments hyaline. *Fruit*; tufted, terminal thecæ.

There is so much resemblance between the plants of this small genus and those of *Calithamnion*, that I can scarcely see the slightest grounds for their separation; in general structure

1609

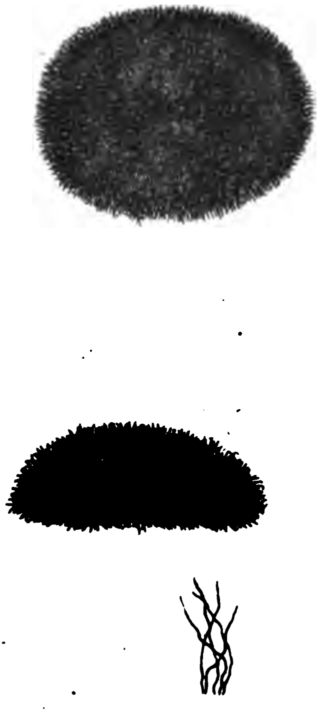
2530.





Chroolepus lichenicola.

June 1 1806. Published by Jas Sowerby London



Chroolepus ebenea?

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192

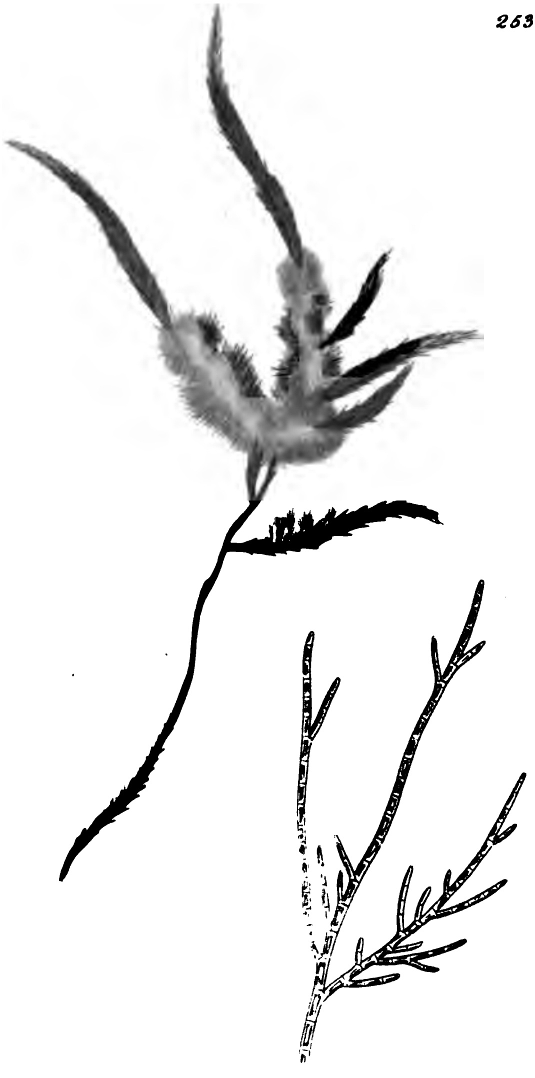
2532

Trentepohlia purpurea?

Sowerby del. July 1 1794.

2585

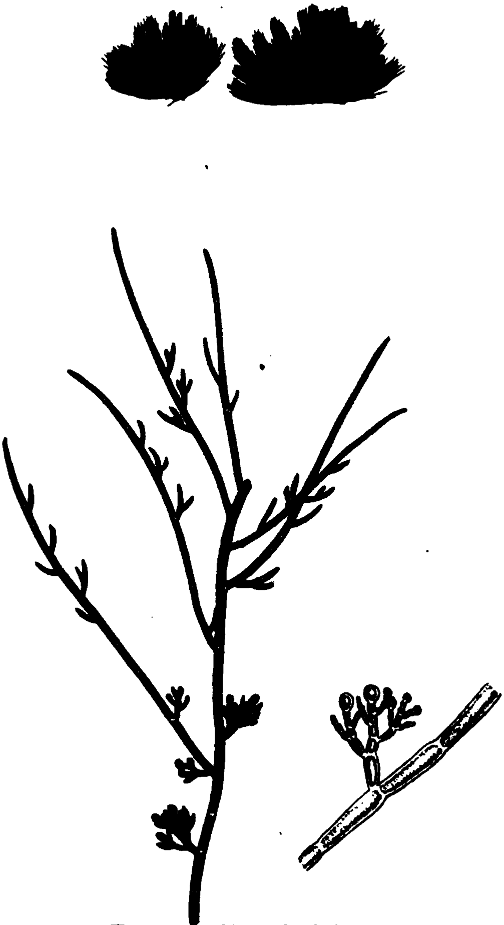
2533.



Trentepohlia pulchella?

1996

2534.



Trentepholia chalybæa.?

Mar 1 1809 Publish'd by Jas Sowerby London

and in fructification, so far as hitherto observed, they appear to be identical.

Named by Agardh in honour of a German botanist, M. Trentepohl.

TRENTEPOHLIA PURPUREA. *Purple Trentepohlia.* TAB. 2532.

Filaments forming continuous velvety patches of a purple colour, very minute, erect, slightly branched, dichotomous. Articulations twice as long as broad.

Byssus purpurea, *Lightfoot. E. B.* 192. Conferva purpurea, *Dillwyn Conf. tab.* 43. Trentepohlia purpurea, *Agardh Syst. Alg.* 36. *Hooker Crypt. Part* 1. 382.

It forms broad uniform patches of a dull reddish-purple colour and of various extent, on rocks and stones near the sea, and generally where it is moistened by the spray, especially lining the insides of caverns on the sea-shore, as that of Fingal in Staffa. The patches are so exceedingly thin, as to appear at first sight only like a stain on the surface of the stone; but a magnifier shows them to consist of innumerable very minute, erect, more or less forked filaments.

"It has many points in common with *Calithamnion Rothii*, and I am almost inclined to think it may be that species, altered by growing in situations where it is only occasionally met with salt water."—*Harvey in Hooker.*

TRENTEPOHLIA PULCHELLA. *Beautiful Trentepohlia.* TAB. 2533.

Filaments tufted, much-branched; branches erect, alternate, beset with short, opposite or secund ramuli. Articulations two to three times as long as broad. "Thecæ racemose."

Conferva nana, *Dillwyn Conf. tab.* 30. *E. B.* 2585. Trentepohlia pulchella, *Agardh Syst. Alg.* 37. *Hooker Crypt. Part* 1. 382.

A native of alpine streams, growing on rocks, or, more frequently, on *Fontinalis* and other aquatic mosses, on which it forms dense upright tufts, or continuous strata, of a light reddish-brown or rose-colour. Filaments irregularly branched, from one eighth to half of an inch long: branches very erect, with few or more short, scattered or alternate, taper-pointed ramuli. Adheres to paper in drying.

TRENTEPOHLIA CORYMBIFERA. *Corymbiferous Trentepohlia.* TAB. 2534.

Filaments much and alternately branched, forming blackish-green tufts. Articulations five or six times as long as broad. Fertile branches corymbose. Thecæ terminal, subglobose.

Conferva corymbifera, *E. B.* 1996. C. chalybea, *Dillwyn Conf. tab.* 91. Trentepohlia pulchella, *var. β. chalybea, Agardh Syst. Alg.* 37. *Hooker Crypt. Part* 1. 382.

First found by Mr. Wm. Backhouse in a sluice of fresh-water, near Darlington, but not unfrequent in subalpine districts. Filaments tufted, half an inch or more in height, blackish in the mass, but of a dull blueish-green when separately examined, extremely slender, re-

...broad.
...middle
...manner,
...generally

...otonema.

...ched, rooting.

...uivocal members of the ...e first on our list of plates, is ...e than the incipient state of a moss, ...cted to have a similar origin; a suspicion, ...ts of the whole series tend to justify, and ...rcumstances attending the germination of the ... the higher orders of Cryptogamous Plants would ...those familiar with them to extend to some other genera, ...higher and lower in the scale of vegetation than Proto-...

The name, bestowed by Agardh, from πρῶτος, *first or primitive*, and νῆμα, *a thread*, alludes to the simplicity of structure, and perhaps to the probable derivation of the filaments, among which neither processes analogous to thecæ, nor modification of the endochrome into sporules, has been yet observed; another negative character in favour of their being incipient stages of development of the plants among which they are found.

PROTONEMA VELUTINUM. *Green Velvet Protonema.* TAB. 2535.

Filaments forming a green stratum, erect, somewhat rigid, entangled, alternately branched. Articulations slightly swelling, twice as long as broad.

Conferva velutina, *E. B.* 2535. Protonema velutinum, *Agardh Syst. Alg.* 43. Byssus velutina, *Linn.*

Common on the ground in moist shady places, in the form of fine green, velvet-like tufts, composed of very short and slender, upright, rigid, branched and entangled filaments. It diffuses a sweet fragrance, like that of the *Jungermanniæ*, not only when growing, but for some time after it has been dried in the herbarium; a fact first remarked by Sir J. E. Smith.

This conspicuous, and, as originally supposed, distinct species, is now known to be the young state of a very common moss, *Polytrichum aloides*. The figure is republished as a guide to the uninitiated.

PROTONEMA UMBROSUM. *Shaded Protonema.*

"Stratum velvety green. Filaments erect, obtuse, fastigiate, fragile. Articulations gibbous."

RENTEPOHLIA.

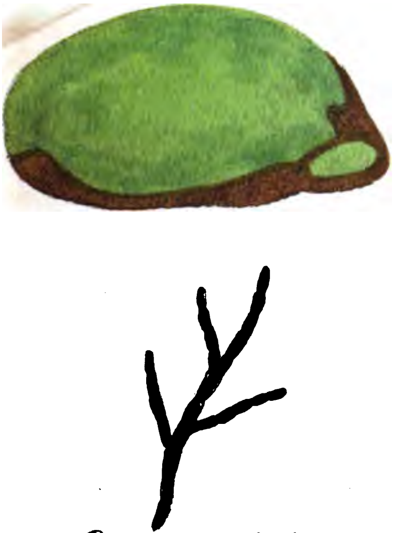
hitherto observed, they appear

German botanist, M.

191

1566

2535.



Protonema velutina?

Feb. 1. 1806. Published by Jas. Sowerby. London.

peatedly branched. Articulations five or six times as long as broad. Ultimate ramuli short, simple or forked above, but about the middle and lower parts of the filaments divided in a corymbiform manner, with short, tumid articulations, the terminal one of which generally enlarges, forming a globular theca.

GENUS DCLXXXIII. PROTONEMA. *Protonema.*

GEN. CHAR. *Filaments* subarticulated, branched, rooting, mostly green.

These simple plants are very equivocal members of the tribe before us: one of them, the first on our list of plates, is known to be nothing more than the incipient state of a moss, and the rest are suspected to have a similar origin; a suspicion, which the habitats of the whole series tend to justify, and which the circumstances attending the germination of the sporules of the higher orders of Cryptogamous Plants would induce those familiar with them to extend to some other genera, both higher and lower in the scale of vegetation than *Protonema.*

The name, bestowed by Agardh, from πρῶτος, *first or primitive*, and νῆμα, *a thread*, alludes to the simplicity of structure, and perhaps to the probable derivation of the filaments, among which neither processes analogous to thecæ, nor modification of the endochrome into sporules, has been yet observed; another negative character in favour of their being incipient stages of development of the plants among which they are found.

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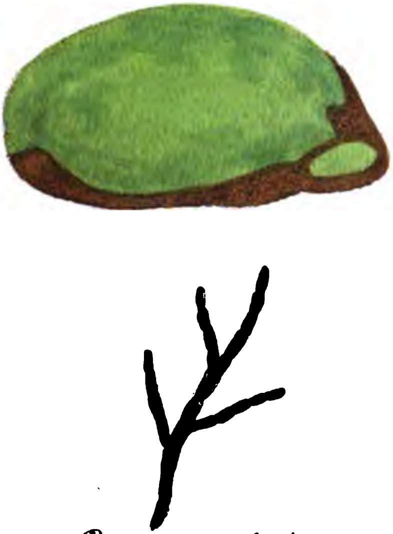
PROTONEMA UMBROSUM. *Shaded Protonema.*

"Stratum velvety green. Filaments erect, obtuse, fastigiate, fragile. Articulations gibbous."

1566

2535.

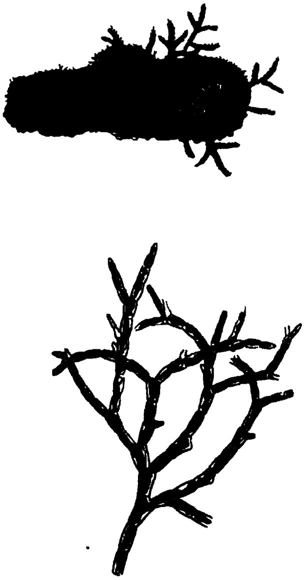


Protonema velutina?

Feb.y 1. 1806 Publish'd by Jas. Sowerby. London.

2588

2536.



Protonema cryptarum

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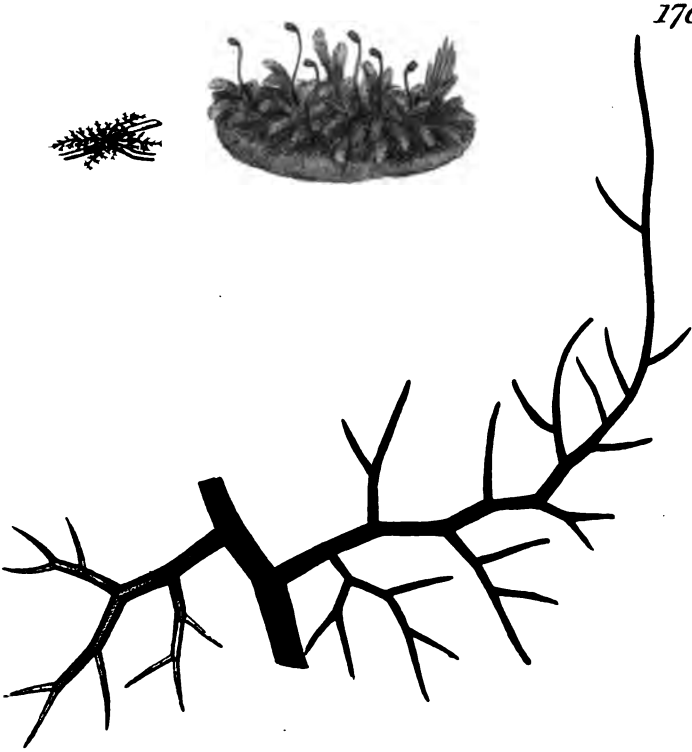
1701

2537.

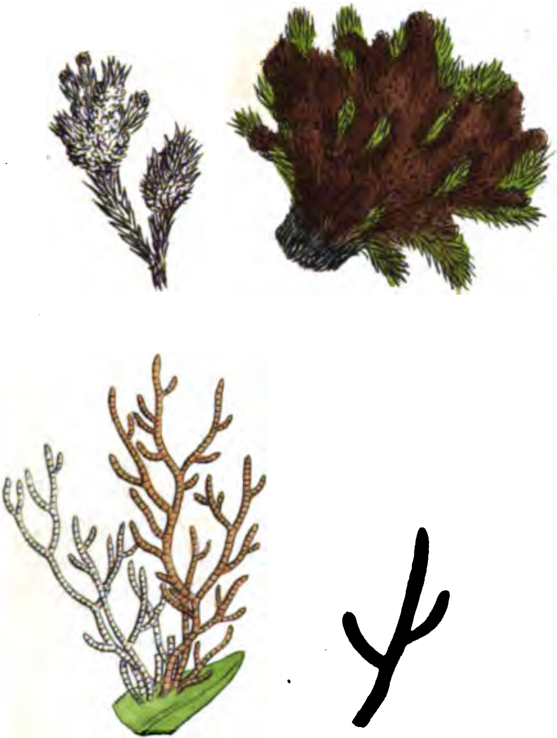


Protonema castanea

Feb 1.1807. Publish'd by Jas Sowerby London.

1638

2538.



Protonema Orthotrici

Aug. 1. 1806 Publish'd by Ja.s Sowerby London.

Conferva umbrosa, *Dillwyn Conf. tab.* 61. Protonema umbrosum, *Agardh Syst. Alg.* 43. *Hooker Crypt. Part* 1. 383.
"On damp ground."

PROTONEMA CRYPTARUM. *Cave Protonema.* TAB. **2536.**

Filaments tufted, green, much-branched, dichotomous, entangled; branches divaricated, acuminated. Articulations twice or thrice as long as broad.

Conferva cryptarum, *Dillwyn Conf. Syn.* 59. *tab. D. E. B.* 2588. Protonema cryptarum, *Agardh Syst. Alg.* 44. *Hooker Crypt. Part* 1. 383.

Found chiefly in caverns and fissures in rocks, whence the specific name. The specimen figured was gathered by Miss Hutchins in a cave near the sea-side, Bantry, Ireland, where the tufts were intermixed with *Hypnum tenellum.* Agardh suspected this species might be the young state of some species of *Phascum.*

PROTONEMA CASTANEA. *Creeping chestnut-coloured Protonema.* TAB. **2537.**

Filaments chestnut-brown, branched; branches alternate, divaricated, subulate. Articulations thrice as long as broad.

Conferva castanea, *Dillwyn Conf. tab.* 72. *E. B.* 1701. C. muscicola, *Weber et Mohr.* Protonema muscicola, *Agurdh Syst. Alg.* 45. *Hooker Crypt. Part* 1. 383.

It creeps in loose, entangled patches among mosses, in shady places, and is far from unfrequent, though very liable to be overlooked, in consequence of its hue resembling the decaying parts of the moss among which it vegetates. The main filaments divide into many alternate, procumbent, somewhat curved branches, which are twice or thrice divided alternately, the ultimate divisions being acute, and all of them so much divaricated as to stand at almost right angles with the branch that supports them. Articulations, in the main branches, from three to four times as long as broad; in the younger shoots, rather shorter.

PROTONEMA ORTHOTRICHI. *Parasitical Protonema.* TAB. **2538.**

Filaments olive-brown, or greenish, erect, crowded, much and irregularly branched; branches obtuse. Articulations about as broad as long.

Conferva muscicola, *E. B.* 1638. C. Orthotrichi, *Dillwyn Conf. tab.* 89. Protonema Orthotrichi, *Agardh Syst. Alg.* 44. *Hooker Crypt. Part* 1. 383.

Common on different species of *Orthotricha,* and evidently a parasite. It forms dense tufts on the leaves and stems, consisting of minute, erect filaments, of a glossy olivaceous or brown colour.

This and *P. castanea* appear to be productions of a different character to the preceding species.

SUBORDER III. GLOIOCLADEÆ.

Plants consisting of numerous globules, or filaments invested with a definite gelatine, usually forming filiform or subglobose fronds.

A very arbitrary assemblage, comprising some of the simplest of known vegetable forms, and many of which are of highly complicated structure, appearing even to belong to a grade of organization superior to that of the highest of the *Confervoideæ*. The less condensed condition of the gelatine, which, in most of the plants of the latter suborder, forming a distinct tube over the articulated vesicles, gives a homogeneous character to the filaments, constitutes the only feature of resemblance between the genera associated in the one before us.

TRIBE XX. BATRACHOSPERMEÆ.

Marine, or freshwater plants, generally filiform or subglobose, composed of articulated, branched filaments, invested with gelatine. Fructification (so far as it is known), thecæ on the ultimate ramuli.

GENUS DCLXXXIV. MESOGLOIA. *Mesogloia.*

GEN. CHAR. *Frond* filiform, mostly solid; the axis gelatinous or somewhat fibrous; the periphery formed of radiating, articulated, subdichotomous coloured filaments. *Fructification*; globular thecæ, or masses of sporules, seated in the dichotomies of the ultimate ramuli, composing the periphery.

The organization of the plants of this genus is very complex, and not at all accordant with their position thus low in the structural series: indeed, but for the absence of a distinctly cellular axis, they seem nearly allied to *Chordaria*, among the Fucoid

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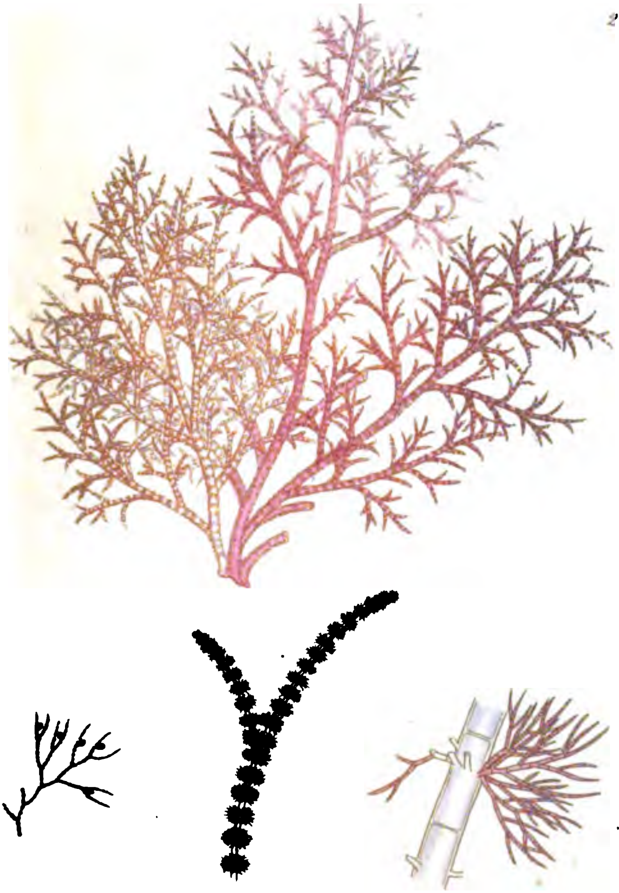
2530.



Mesogloia coccinea?

Oct 1.1812 published by Jas Sowerby London

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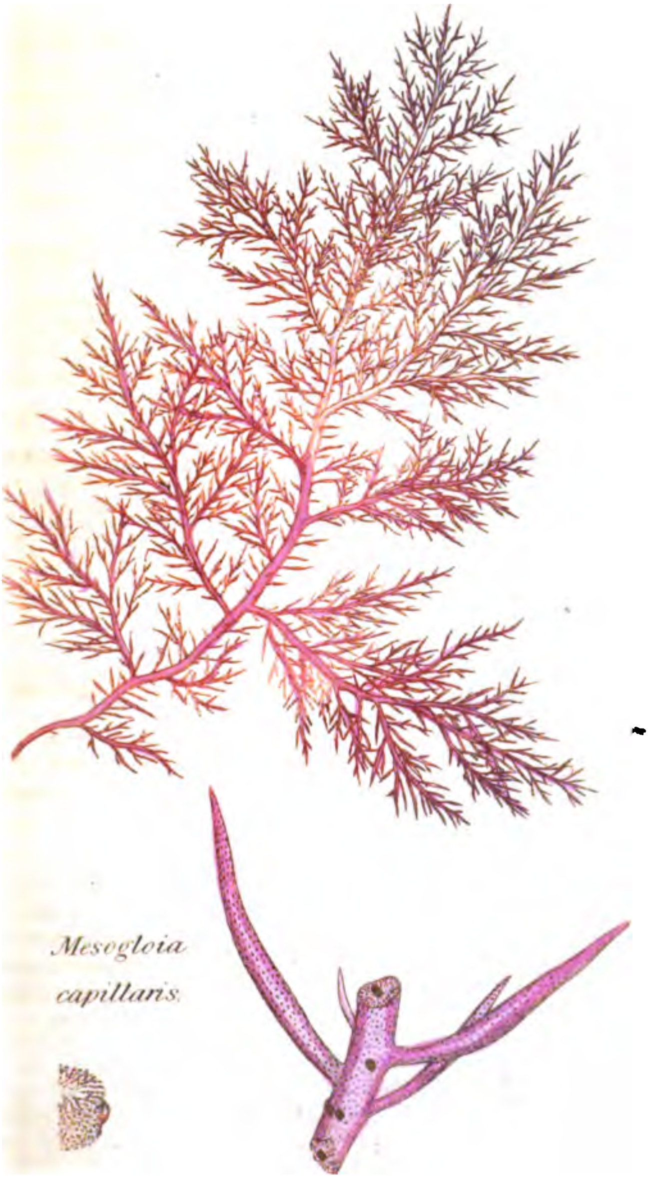

Mesogloia capillaris.

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or Inarticulated Algæ; a genus, the typical species of which, *C. flagelliformis*, Mr. Harvey is inclined to remove from that section to the tribe before us. *Mesogloiæ* appear rather to be imperfect *Chordariæ*.

The name, bestowed by Agardh, from *μέσος*, *the middle*, and *γλοιὸς*, *viscid*, alludes to the gelatinous character of the axis.

Eight native species have been described, all marine: the rich crimson or rose-red colour of some of them, and the delicately divided frond, render them conspicuous among the most elegant productions of our shores.

MESOGLOIA COCCINEA. *Moniliform rose-red Mesogloia.* TAB. **2539.**

Frond rose-red, much-branched; branches moniliform, irregularly dichotomous, attenuated. Radiating filaments subdistantly whorled.

Rivularia verticillata, *E. B.* 2466. Mesogloia coccinea, *Agardh Syst. Alg.* 51. *Hooker Crypt. Part* 1. 386.

Not very unfrequent on the southern coasts of England and Ireland, and in the Bristol Channel. Fronds from two to six inches high, of various shades of pink and rose-red, much and alternately branched; formed of numerous close whorls of repeatedly-branched, taper-pointed, articulated, pink filaments, springing from a very pale-coloured axis, which gives it a moniliform appearance to the naked eye. The whole enveloped in mucilage, tender and slippery to the touch. Thecæ minute, obovate or subglobose, red.

MESOGLOIA CAPILLARIS. *Capillary rose-red Mesogloia.* TAB. **2540.**

Frond rose-red, tubular, much-branched; branches opposite or alternate, attenuated at the base; ramuli short, very slender, alternate, subulate.

Fucus capillaris, *Turner Hist. Fuc. tab.* 31. *E. B.* 2191. Mesogloia capillaris, *Agardh Syst. Alg.* 51. *Hooker Crypt. Part* 1. 386.

Found chiefly on the southern coasts of England and Ireland. Fronds from five to ten inches high, filamentous, of a fine pink or rose-colour, and gelatinous substance, much and repeatedly branched; the principal branches longest in the middle part of the frond, often nearly opposite; ramuli mostly alternate, tapering at both extremities, flexuose.

I have never examined this species in a recent state, and Mr. Harvey, who gives Mr. Turner's synonym, though he does not quote our figure, seems to express a doubt of its appertaining to the genus, to which the tubular character of the frond is, apparently, the chief exception; the periphery being undoubtedly constructed of closely crowded radiating filaments, though these are very imperfectly expressed in our magnified figure.

MESOGLOIA VERMICULARIS. *Worm-like Mesogloia.* TAB. **2541.**

Frond brownish-olive, cylindrical, irregularly branched; branches subpinnate, vermicular, linear-fusiform, flexuose. Radiating filaments crowded, clustered, thickened upwards, obtuse.

Rivularia vermicularis, *E. B.* 1818. Mesogloia vermicularis, *Agardh Syst. Alg.* 51. *Hooker Crypt. Part* 1. 387.

Common on various parts of the coast of Great Britain and Ireland. Fronds from six inches to a foot or more in height, olive-brown, very much and irregularly branched, cylindrical, solid, crooked and flexuose, resembling, when freshly taken out of the water, a bunch of worms. The whole substance is succulent and between gelatinous and cartilaginous; externally composed of closely-set, pellucid, articulated, branched and flexuose, slimy filaments, firmly compacted in the inner part, but terminating on the surface in innumerable clusters of short, moniliform ones, of a darker hue, the almost globular articulations of which become gradually larger towards the extremity. Thecæ subglobular, seated between the short, tufted filaments.

GENUS DCLXXXV. BATRACHOSPERMUM.

Batrachospermum.

GEN. CHAR. *Frond* filiform. Main filaments invested with gelatine, hyaline, tubular, longitudinally striated, composed of colourless, articulated fibres agglutinated together; beset with distant whorls of moniliform ramuli. *Fructification*, globular thecæ seated in the whorls.

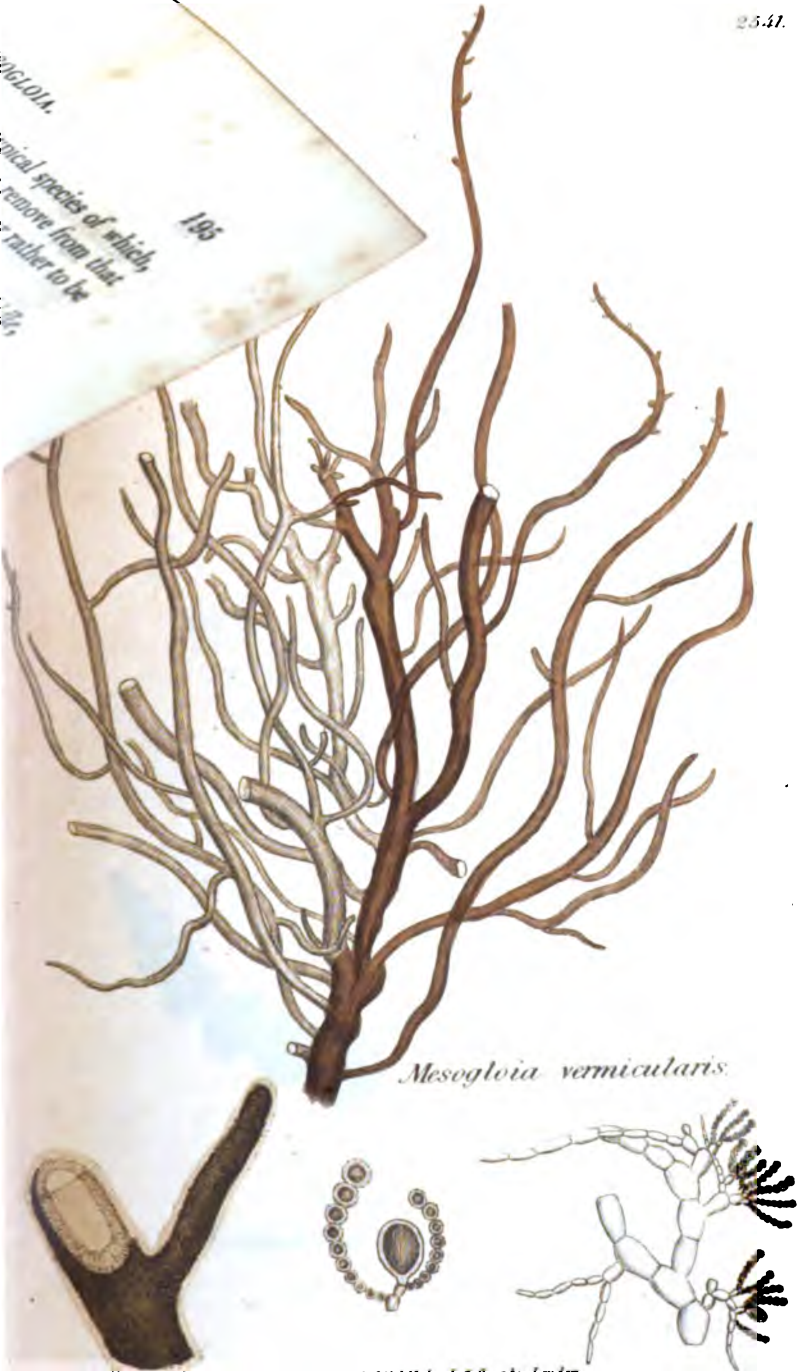
A structure equally complicated with that of *Mesogloia*, and perhaps not widely removed from it, though the general habit of the plants is different, characterizes *Batrachospermum*, or the *Frog-spawn Alga*, named, by Roth, from a fanciful resemblance between the gelatinous masses formed by the aggregation of the fronds and the substance in question, from *βάτραχος, a frog*, and *σπέρμα, seed or spawn.*

The species inhabit freshwater ditches and rivulets.

"In this genus the stem and primary branches of the frond are made up of a bundle of confervoid fibres, agglutinated together; while the ultimate branches, as well as the whorled ramuli, consist of a single tube. The articulation of the former is also probably spurious, and merely a darkening or intumescence, caused by the egress of so many ramuli from the same point. This structure brings it so near to *Mesogloia*, that no essential difference remains, excepting in the disposition of the radiating branchlets."—*Carmichael in Hooker.*

1818

2541.



Mesogloia vermicularis.

Nov. 1 1807. Publish'd by Jas. Sowerby London.

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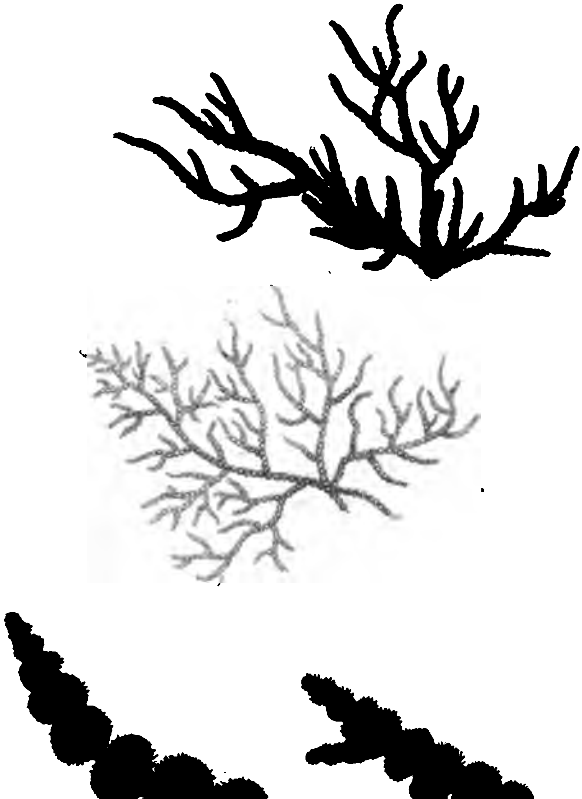
2542.



Batrachospermum moniliforme.

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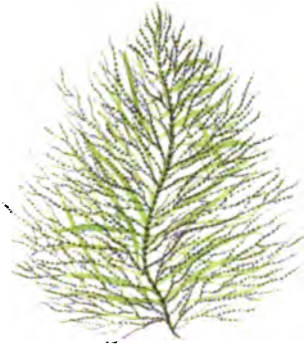

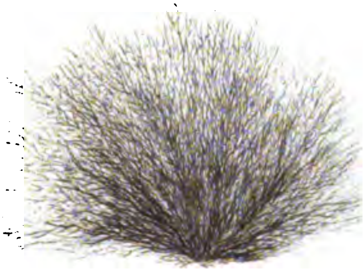

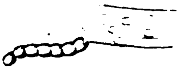

Batrachospermum detersum?

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BATRACHOSPERMUM moniliforme. *Moniliform Batrachospermum.* Tab. 2542.

Frond irregularly branched; branches moniliform, attenuated at the apex. Whorled ramuli compound, bearing the thecæ.

Conferva gelatinosa, *Linn.*? *E. B.* 689. *Dillwyn Conf. tab.* 32. Batrachospermum moniliforme, *Agardh Syst. Alg.* 53. *Hooker Crypt. Part* 1. 388. Chora batrachosperma, *Weiss.*

Found in freshwater pools, ditches, and streamlets, throughout the kingdom, especially where the water is clear, growing attached to pebbles and other substances. The whole plant is very slimy and tender to the touch, varying in colour from a dark blackish or greyish-green to a pale bluish hue, which latter it often assumes in drying. Frond very much branched, appearing at first sight to be composed of numerous, closely-set, bead-like articulations, each of which is seen by a magnifier to be a whorl of minute compound filaments, bearing the thecæ.

Both this and the following, which is probably a mere variety, are very beautiful and elegant plants, especially when slightly magnified so as to distinguish the whorls.

BATRACHOSPERMUM detersum. *Blackish moniliform Batrachospermum.* Tab. 2543.

Branches moniliform, attenuated at the apex. Whorled ramuli short, simple.

Conferva atra, *Hudson. E. B.* 690. *Dillwyn Conf. tab.* 11. Batrachospermum moniliforme, β. detersum, *Agardh. Harvey in Hooker.*

Found in similar situations to the preceding, but much less robust in its habit, and otherwise differing in the character of its whorls, as shown in our magnified figure. Whether really a distinct species is doubtful. Mr. Turner, as quoted in the 'English Botany,' makes the following remarks: "It begins to appear in the end of March, consisting of short, extremely delicate filaments, irregularly branched, of a pale green colour, and continues increasing till the middle of May, when it is in perfection, the stems being then about an inch and a half long, bushy, of a darker green, almost black at the base, but not sufficiently so as to justify the name (*atra*), except when dried. From this period it gradually decays, loses its finer parts, becomes rigid, and by the beginning of August completely disappears. The stem is swollen at the joints, and whorled with minute, fine, jointed, short, simple filaments. It differs at first sight from *B. moniliforme* in texture and thickness."

BATRACHOSPERMUM vagum. *Cylindrical Batrachospermum.*

Frond cylindrical, equal, subdichotomous; apices of the branches incrassated.

Batrachospermum vagum, *Agardh Syst. Alg.* 52. *Hooker Crypt. Part* 1. 388. *Lyngbye Hydroph. Dan. tab.* 64.

Common in alpine lakes, pools, and rivulets. Frond very much branched, from two to three or four inches in height, dull green, varying to a "bright æruginose or even blue."

The habit of this plant is different from that of *B. moniliforme*, the dichotomous division of the frond being, in my specimens, very regular throughout; but I have always regarded it as an alpine variety of the latter. The distance of the whorls varies greatly, even in the same specimen, some of the branches in one now before me being distinctly moniliform to the naked eye, while in the rest the whorls are so close that they appear uniform and cylindrical.

GENUS DCLXXXVI. DRAPARNALDIA.

Draparnaldia.

GEN. CHAR. *Frond* filiform, diorganous. Main filaments gelatinous, hyaline, emitting, at the joints, pencils of coloured ramuli.

A genus of freshwater Algæ, so nearly resembling *Conferva* in habit and apparent structure, as to be scarcely separable but by its gelatinous texture. The species, of which there are, perhaps, several indigenous, besides those here described, are among the most elegant of our water-plants.

Named after J. P. R. Draparnaud, a French algologist.

DRAPARNALDIA PLUMOSA. *Feathery Draparnaldia.* TAB. 2544.

Pencils of ramuli linear-lanceolate, acute.

Conferva lubrica, *E. B.* 2087 (not of *Dillwyn Conf. tab.* 57). Draparnaldia plumosa, *Agardh Syst. Alg.* 58. *Hooker Crypt. Part* 1. 388.

Frequent in springs, wells, and rivulets, growing in tufts that float with the stream, on pebbles, wood, &c. Fronds from a span to a foot or more in length, of a fine, slightly glaucous-green colour in the mass, very gelatinous and slimy to the touch. Each of the main filaments is beset throughout with numerous, opposite, more or less divided branches of different lengths, bearing the pencils of coloured ramuli.

Mr. Harvey considers this and the following to be scarcely specifically distinct.

DRAPARNALDIA GLOMERATA. *Clustered Draparnaldia.* TAB. 2545.

Pencils of ramuli ovate, obtuse, patent.

Conferva mutabilis, *Roth. Dillwyn Conf. tab.* 12. *E. B.* 1740. Draparnaldia glomerata, *Agardh Syst. Alg.* 58. *Hooker Crypt. Part* 1. 388. Conf. gelatinosa, γ. *Hudson.*

Found in similar habitats to the preceding, sometimes accompanying it, and equally common. The stems and main branches are remarkably pale and pellucid; what little colour they have seems to be collected generally in the middle of each articulation; the bright green hue of the mass being chiefly derived from the darker green of the pencilled filaments.

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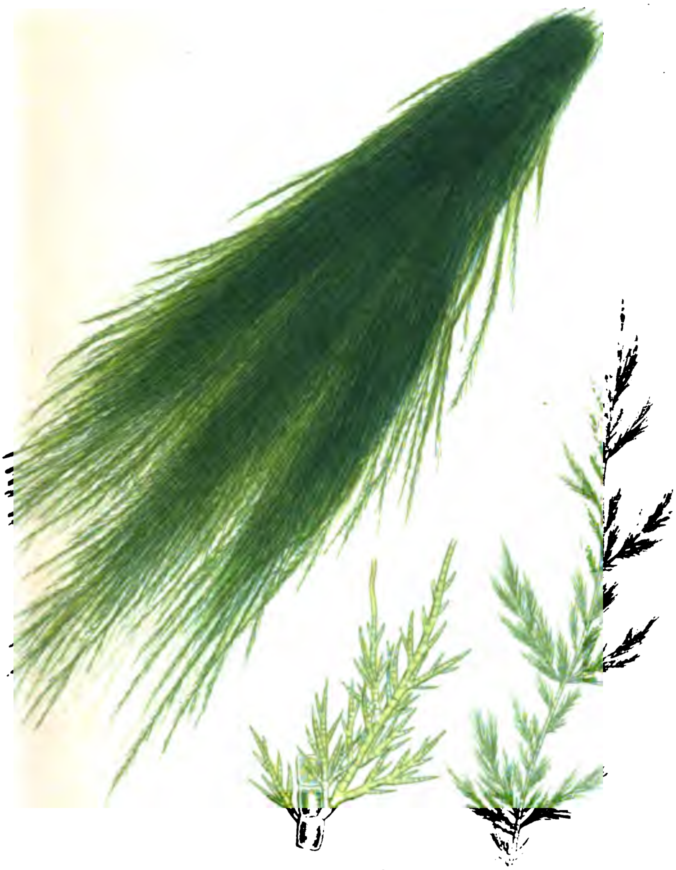

Draparnaldia plumosa.

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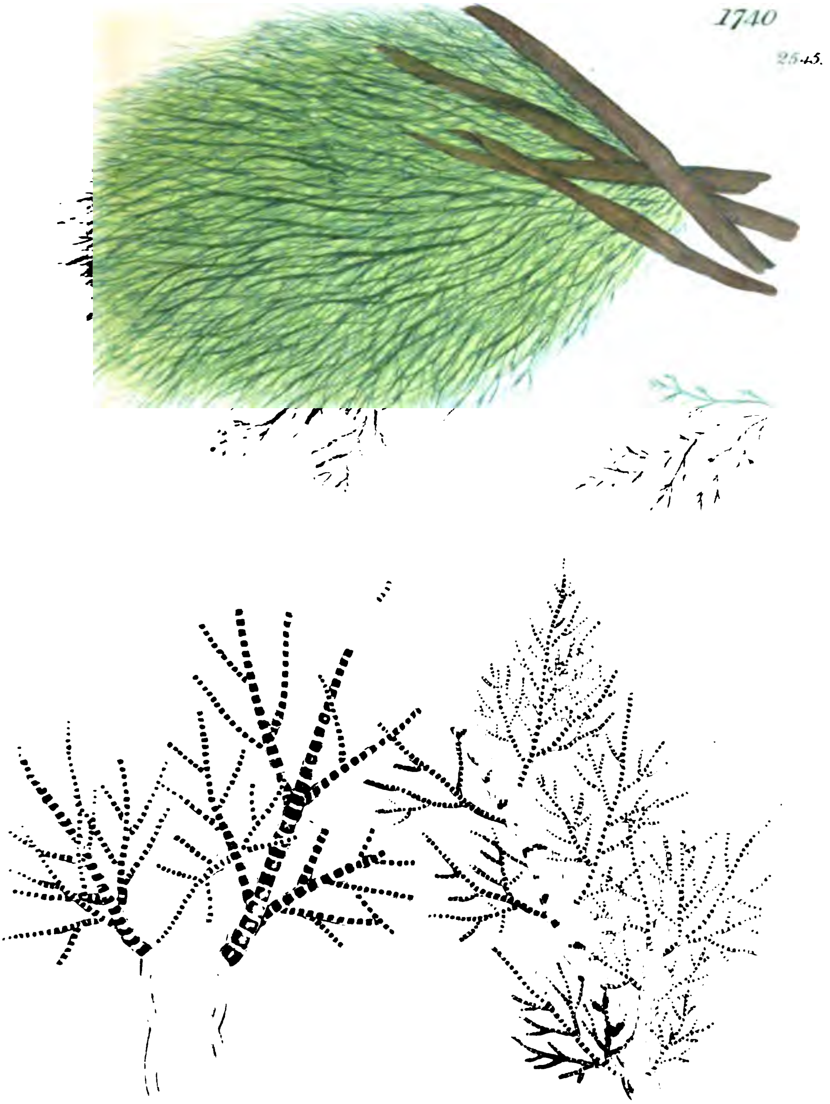

Draparnaldia glomerata.?

May 1 1807 Publish'd by Jas Sowerby London

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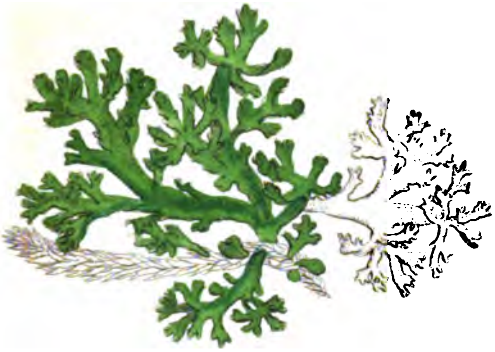
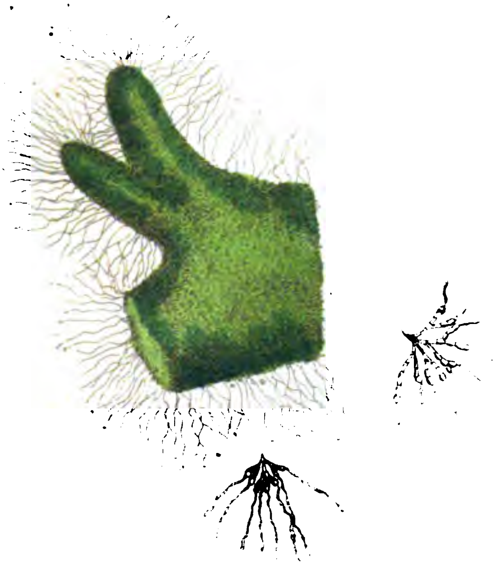


Chætophora endiviæfolia.



1813. Published by Jas Sowerby London

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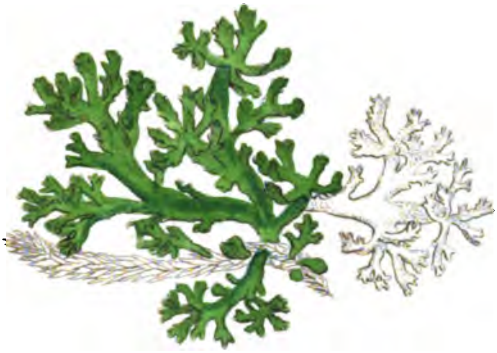
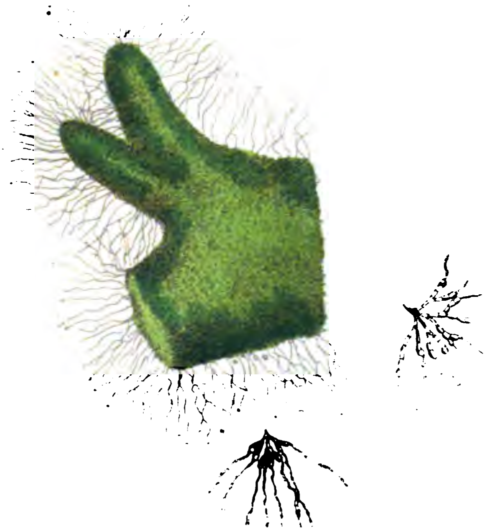


Chætophora endiviæfolia.



1802. Publish'd by Jas. Sowerby London

DRAPARNALDIA TENUIS. *Slender Draparnaldia.*

"Ramuli simple, subfasciculate. Primary filament partially coloured."

Conferva lubrica, *Dillwyn Conf. tab.* 57. Draparnaldia tenuis, *Agardh Syst. Alg.* 57. *Hooker Crypt. Part* 1. 388.

Found in pools and rivulets, forming slender tufts. To this species Mr. Harvey likewise refers *Conferva protensa* and *C. exigua* of Dillwyn, the latter being only the younger state of the same.

GENUS DCLXXXVII. CHÆTOPHORA. *Chætophora.*

GEN. CHAR. *Frond* gelatinous, globose or lobed, rarely plane and crustaceous, composed of numerous filaments aggregated together, and issuing from a common base. *Filaments* articulated, branched; articulations of the branches subhyaline, those of the ramuli coloured.

This, in its present extent, though a very small genus, is scarcely a natural one, even restricting it to the freshwater species, which display considerable difference in habit. The name, bestowed by Agardh, from χαίτη, *a bristle*, and φορέω, *to bear*, alluding to the long setaceous filaments, which terminate the ramuli of some species at a particular season of development, is not the most characteristic that might have been devised, other genera of the same group having similar appendages.

Two species only are figured in 'English Botany,' but several others are natives of Britain, two of which, *C. Berkeleyi* of Dr. Greville, and *C. pellita* of Lyngbye, are marine productions, and doubtful members of the genus.

CHÆTOPHORA ENDIVIÆFOLIA. *Endive-like Chætophora.* TAB. 2546.

Frond gelatinous, subdichotomously branched, flattish, clothed with tufted articulated filaments.

Ulva incrassata, *Hudson*? *E. B.* 967. Chætophora endiviæfolia, *Agardh Syst. Alg.* 28. *Hooker Crypt. Part* 1. 389.

Frequent in ponds, lakes, and rivulets, growing on stones and various aquatic plants. The specimen figured was taken from a pond at Finchley, growing on *Hypnum riparium*, and intermixed with *Chara hispida*. Fronds much-branched and divaricated, variously sinuated and toothed, compressed, the edges, of their lower part especially, incrassated. Colour grass-green. The whole plant is gelatinous and slimy to the touch; the surface everywhere clothed with minute, thickly-set tufts of branched, articulated filaments, each branch terminating in an elongated, diaphanous seta.

CHÆTOPHORA TUBERCULOSA. *Tubercular Chætophora.* TAB. **2547.**

Frond gelatinous, at first globose and firm, afterwards much-lobed and tuberculated, fragile, and hollow. Filaments very slender, flexuose, hyaline; ramuli coloured, palmato-fasciculate.

Rivularia tuberculosa, *Roth. E. B.* 2366. Chætophora tuberculosa, *Hooker Scot.* 2. 76. *Crypt. Part* 1. 389. C. pisiformis, β. tuberculosa, *Agardh Syst. Alg.* 27.

This curious species is met with, adhering to stems, roots, and other substances, in the water of stagnant pools and ditches, especially in a boggy soil. The whole substance is composed of minute, repeatedly-branched, divaricated, obtuse filaments, as shown in the magnified figure, the bases of which seem eventually to decay, leaving a cavity in the interior. If distinct from *C. pisiformis*, the fructification of this plant has not been hitherto found on British specimens; but Dr. Müller of Detmold has published some interesting observations regarding it, which, though not yet substantiated by the researches of other naturalists, are deserving of notice here, on account of their singularity, as well as to stimulate inquiry into the history of a series of vegetable productions whose economy is at present little understood: his account of the process of its fertilization, and of the growth of the sporules, is, greatly abridged, as follows:—

Each theca is accompanied by a small red globule, which, as it advances toward maturity uniting with it, discharges its contents and disappears. The theca contains about five sporules, disposed round an aperture, apparently that through which the contents of the globule entered. Each sporule developes a hyaline filament, formed of granules successively discharged from its interior, which eventually appears as a transparent tube containing a moniliform series of green globules; the extreme globule of this series afterwards elongates and forms another tube, and, the sporules thus developing together, the theca disappears, the whole mass assuming the true character of the species thus curiously propagated.

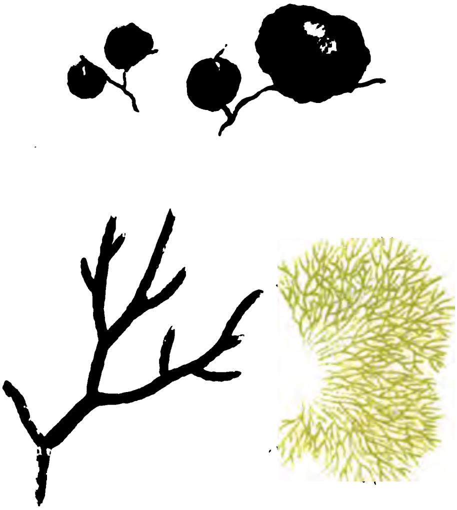
For other native species of the genus see Hooker Crypt. Part 1. 389–390, and for figures consult 'Gleanings of British Algæ' by the Rev. M. J. Berkeley.

GENUS DCLXXXVIII. CORYNEPHORA.

Corynephora.

GEN. CHAR. *Frond* globose or lobed, carnoso-coriaceous, hollow, or not filled with gelatine, composed of dichotomous, articulated filaments, fasciculated at their apices, and issuing from a central point. *Fructification*; oval thecæ or masses of sporules, seated in the terminal fasciculi.

A single species constitutes this genus, which has been variously referred by different writers, misled by partial ob-



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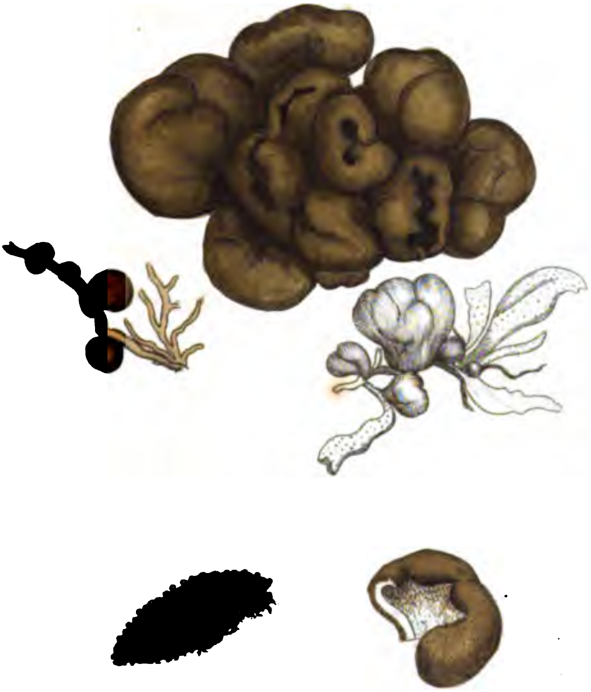
2548.



Corynephora marina?

Nov. 1. 1808. Published by Jas. Sowerby London.

servation of its structure. Mr. Harvey is perhaps the nearest to fact in his statement that it is "closely related to *Mesogloia*, but differing in the absence of a filiform axis." Agardh's transposal of it from *Rivularia*, as the type of a separate genus, has obviated the difficulty of its allotment until the economy of these obscure plants is better known. The thickened apices of the agglutinated filaments is alluded to in the name, from *κορύνη*, *a club*, and *φορέω*, *to bear*.

CORYNEPHORA **MARINA.** *Marine Corynephora..* TAB. **2548.**

Rivularia tuberiformis, *E. B.* 1956. Corynephora marina, *Agardh Syst. Alg.* 24. *Hooker Crypt. Part* 1. 390. Chætophora marina, *Lyngbye Hydroph. Dan. tab.* 66. *Greville Crypt. Fl. tab.* 25. Tremella difformis, *Linn.*

Frequent on all our rocky shores, growing on rocks, corallines, and various Algæ. In a recent state, and several growing together, as in our figure, they resemble a bunch of young potatoes in colour as well as in form. When full-grown, each plant is from half an inch to an inch in diameter, of a more or less irregularly globose figure, hollow, pale brown externally, whitish within, and of a tough but somewhat gelatinous consistence. A perpendicular section, when magnified, shows the substance to consist of a congeries of cohesive filaments, whose upper extremities meet in a parallel order at the surface.

"In young plants, the central cavity is traversed by a system of very wide, inflated, jointed, hyaline tubes, branching dichotomously, while they radiate in all directions to the surface, where each branch terminates in a tuft of short, club-shaped, moniliform, coloured ramuli; among these last, which by their lateral cohesion form the whole substance of the plant, the sporidia are found nestling: they are obovate, smooth, and mostly solitary."—*Carmichael in Hooker.*

TRIBE XXI. RIVULARIEÆ.

Marine or fresh-water plants, of a more or less globose form, carnose, composed of continuous filaments annulated within.

GENUS DCLXXXIX. RIVULARIA. *Rivularia.*

GEN. CHAR. *Frond* globose or lobed, rarely incrusting, green or olivaceous, carnose or gelatinous, composed of continuous filaments annulated within, and surrounded by or set in gelatine.

The name, bestowed by Roth on certain species, in allusion to their fresh-water habitat, is in the present state of the genus inappropriate, many of them being marine.

Corynephora resembles it in habit, but their filamentous structure is very dissimilar, though perhaps scarcely such as to warrant their allotment in different tribes. The genus, though much reduced in extent, is but ill-defined, and will undergo further division when its species are better understood. Of eleven native species, only three are figured in the 'English Botany.'

RIVULARIA ATRA. *Black Rivularia.* TAB. 2549.

Fronds minute, scattered, hemispherical, smooth, firm, glossy-black. Filaments slender, dichotomous, concentric, green.

Rivularia atra, *Roth. E. B.* 1798. *Agardh Syst. Alg.* 24. *Hooker Crypt. Part* 1. 392.

Very common on rocks and timber constantly washed by the sea, as well as on various Algæ. Fronds generally about the size of rape or mustard-seed, but sometimes larger, solitary, more or less scattered, sessile, hard, of so very dark a green as to appear black, having a slimy gloss, in consequence of the pellucid character of the gelatinous extremities of the filaments which form the surface. A perpendicular section shows the filaments of the interior of a dull green colour, radiating from the centre or base, closely compacted and parallel, and branched dichotomously.

RIVULARIA PISUM. *Spherical Rivularia.*

"Frond globose, smooth, soft, shining, dark-green. Filaments dichotomous."

Rivularia Pisum, *Agardh Syst. Alg.* 25. *Berkeley Alg. tab.* 2. *fig.* 2. *Hooker Crypt. Part* 1. 392. Linkia dura, *Lyngbye Hydroph. Dan. tab.* 67.

Found in fresh-water rivulets in hilly and mountainous districts, growing on pebbles and on various aquatic plants. But for the difference in its habitat I should regard this as a variety of *R. atra*; indeed it seems scarcely possible to define them as distinct species.

RIVULARIA CALCAREA. *Stony Rivularia.* TAB. 2550.

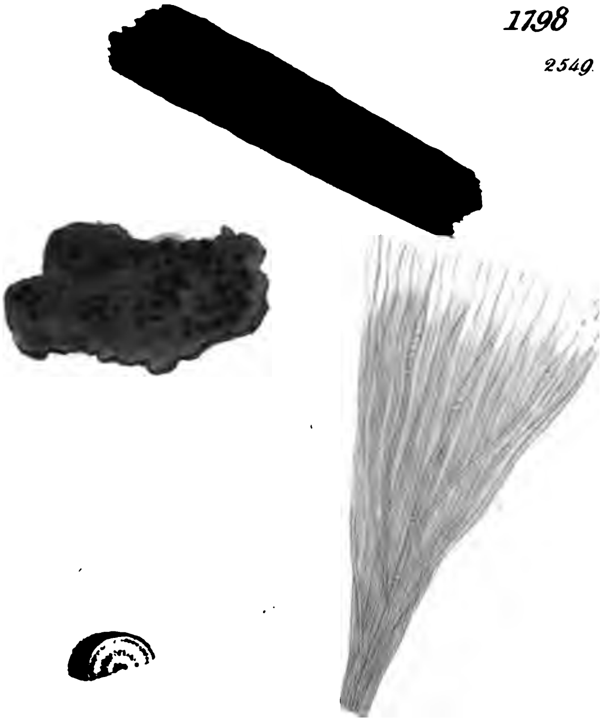
Fronds hemispherical, green, hard, eventually often aggregated into a broad spongy crust, zoned within. Internal filaments straight, compact, simple.

Rivularia calcarea, *Smith E. B.* 1799. *Agardh Syst. Alg.* 26. *Hooker Crypt. Part* 1. 392.

Sent to Sir J. E. Smith by Dr. Scott, who seems to have first observed it, from the bed of a river in Queen's-county, Ireland; but apparently not unfrequent in subalpine districts, growing on rocks and stones in rivulets, and on the borders of lakes and waterfalls, more especially where the water forms calcareous deposits. Fronds roundish or subglobose, from the size of a small pea to half an inch

1798

2549.

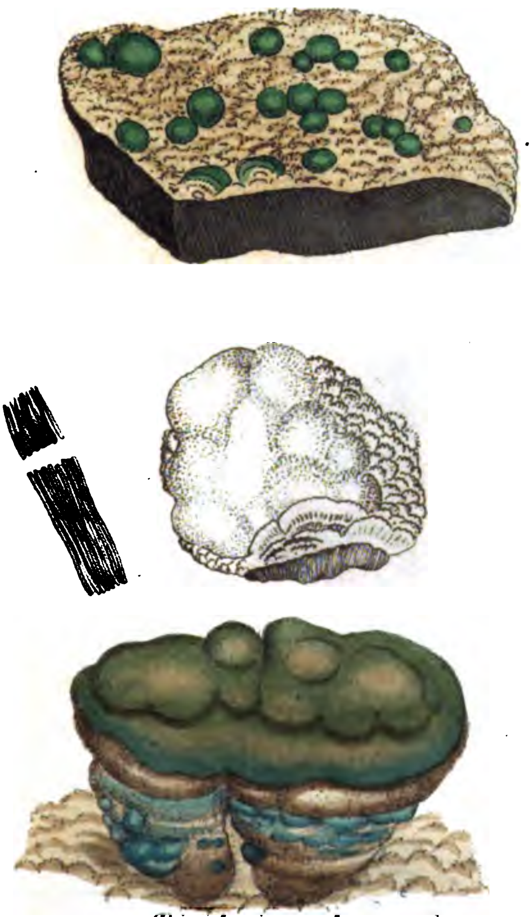


Rivularia atra.

Oct. 1. 1807 Published by Jas. Sowerby London

1799

2550

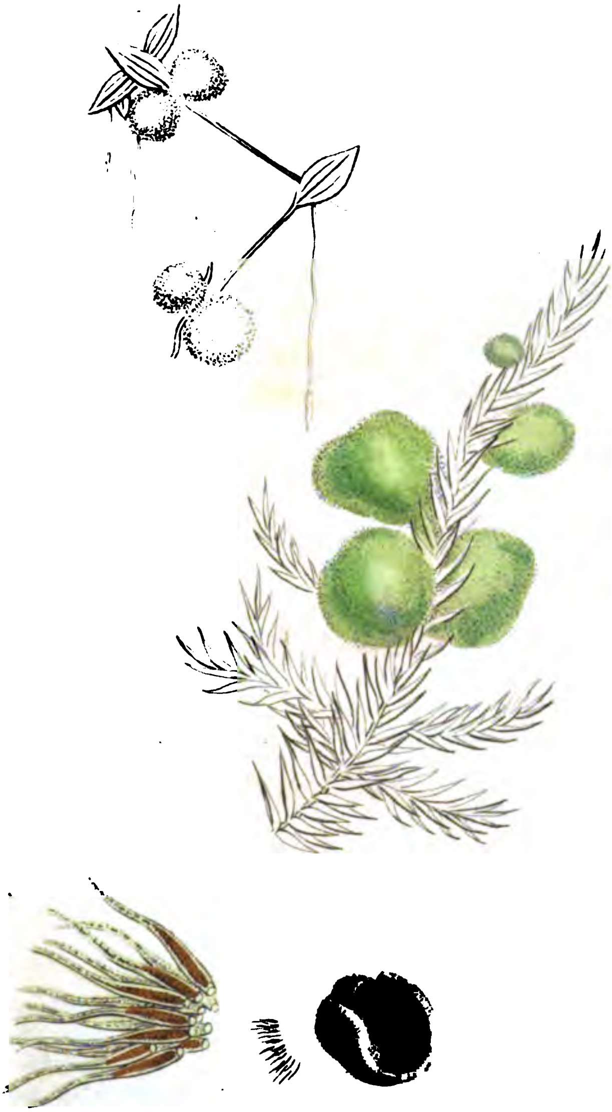


Rivularia calcarea.?

Oct 1 1807 Published by Jas Sowerby London

968

2551.



Rivularia angulosa?

Jan^y 1. 1802. Published by Ja^s Sowerby. London.

in diameter, more or less clustered, and in their ultimate growth running together, so as to form an uneven crust-like mass on the stone. Captain Carmichael found "on the smooth face of a rock, exposed to the trickling of water, a connected sheet of it, upwards of a foot in diameter." The external surface is of a deep green, varying to brown, and slimy to the touch. When cut through perpendicularly, it is found to be composed of a dense mass of parallel, radiating filaments, and is more or less concentrically zoned, the number of zones probably indicating the successive years of its increase. The older portions are impregnated with a calcareous matter, evidently in many instances derived from the water in which it grows, which gives them a hard, stony, but somewhat friable consistence, and increases the difficulty of detecting the real organization of the very slender closely compacted filaments composing its structure.

RIVULARIA PRUNIFORMIS. *Plum-like Rivularia.* TAB. **2551.**

Fronds gregarious, roundish, gelatinous, hollow, olivaceous. Filaments distant, simple, subulate, moniliform within.

Ulva pruniformis, *E. B.* 968. Rivularia angulosa, *Roth. Agardh Syst. Alg.* 25. *Hooker Crypt. Part* 1. 394. Linkia natans, *Lyngbye Hydroph. Dan. tab.* 67.

Not unfrequent in ponds and lakes, growing on aquatic mosses, duck-weed, and other water plants, the fronds varying in size from that of a pea to that of a bullace plum; their colour is a dull olive-green or brownish; they generally grow more or less clustered, and are frequently confluent. The hollow is sometimes filled with pulp, and is apparently formed during the process of growth from a central point, as in *Codium Bursa*: the exterior coat consists of filaments radiating from the cavity, on the face of which they are tolerably compact, with a diaphanous globule at the base of each, but become gradually thinner toward the outer surface, where they terminate in very slender, distant points, the intervals between which are occupied with mucilage. The lower half of each filament contains a brownish, moniliform endochrome, the upper half is pale and empty.

When detached from the plant on which they grow, the fronds rise to the surface of the water "with the velocity of an air-bubble."

TRIBE XXII. NOSTOCHINEÆ.

Plants more or less globose, gelatinous or carnose, including granules scattered through the mass, or arranged in moniliform series.

This tribe comprises the lowest known forms of vegetable existence. Some of the individuals belonging to it are of such extreme simplicity of structure, that it is scarcely possible for the imagination to conceive the existence of organization in any form below them: such are those appertaining to the genera *Protococcus* and *Hæmatococcus*, of which, however, we have no figures in the 'English Botany.' *Protococcus nivalis*, literally the "first fruit of the snow," is the plant which gives colour to the red snow of arctic and high alpine regions, a phænomenon that excited the attention of most of the naturalists of Europe, on the return of Captain Ross from his polar expedition; who described it as covering mountains six hundred feet high, and occupying a length of about eight English miles, with a fine purplish-red tint, ascertained in some places to penetrate the snow to the depth of ten or twelve feet. The little plants to which this colour is due are microscopic; each of them is a simple globular vesicle, perfectly diaphanous, but filled with a coloured endochrome, consisting of innumerable granules floating in a mucous fluid: these granules enlarge, becoming vesicles like that which contains them, and which eventually rupturing by their distension, scatters them abroad, to undergo a similar simple course of development, death, and renewal of their kind. In the regions of perpetual frost it seems far from being an uncommon production in various parts of the world, nor is it confined to such, unless some kindred species, which at present we have no means of distinguishing from the supposed solitary prototype of its genus, be confounded with it by our cryptogamic botanists: in North Britain and in several parts of Ireland, it is found occasionally, "in the form of a thin stain-like stratum on the surface of rocks, or investing decayed vegetable substance with a purple crust;" Dr. Greville has thus figured it from the island of Lismore, in all its different stages, in tab. 231 of his 'Cryptogamic Flora.' When found apart from snow, the globules are always seen scattered over an exceedingly thin and transparent gelatinous or mucous layer[*], the nature of which is not understood.

The propriety of separating *Hæmatococcus*, as a genus, from *Palmella*, is, in the present state of our knowledge of these very obscure and apparently simple productions, questionable. *H. sanguineus* was found by Captain Carmichael, spreading over the dry roof of a stalactitic cavern, in a rock of quartz. Appin, Scotland, to the extent of several yards, in the form of a thick, uneven efflorescence, of a brick-red colour externally, but whitish within. It is moist, but not gelatinous, very friable, and, under the microscope, is found to consist of small pellucid bodies, of various shapes, in each of which are lodged from one to three minute, spherical granules.—*Carmichael in Hooker.*

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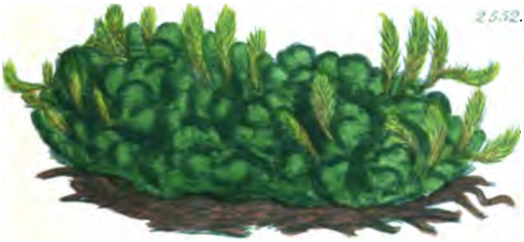
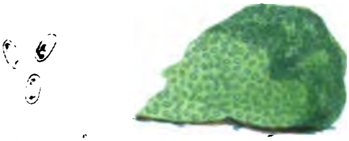
[*] See introductory remarks upon the Algæ, pages 1 and 2 of this volume.

2583

2552.





Palmella protuberans.

1814 published by Jas. Sowerby London

GENUS DCXC. PALMELLA. *Palmella.*

GEN. CHAR. A polymorphous gelatine, filled with distinct globular or elliptical granules.

Mr. Harvey observes, that, "in natural affinity, this genus stands exactly intermediate between *Tetraspora* (to which it is allied by *P. terminalis*) and *Nostoc*; thus connecting the great tribes of *Ulvaceæ* and *Oscillatorieæ*, which, at first sight, appear so little related to each other." The affinity of *Palmella* to the lower grades of *Ulvaceæ* is, perhaps, about equivalent to that of *Draparnaldia* with *Conferva*: we have only to consider the gradual transition of the cellular structure of the frond in some species of the latter, to that gelatinous consistence which in *Tetraspora* presents an almost amorphous mass, in which the sporules are so loosely disposed as scarcely to evince any trace of their vesicular development, to be satisfied of the closeness of the parallel. But the connexion with *Oscillatorieæ* is by no means clear: surely the strictest examination cannot trace any resemblance between the moniliform filaments of *Nostoc* and the continuous ones of the tribe in question; or between the comparatively firm, coriaceous, or at most, subgelatinous frond of the latter genus, and the mucous stratum of *Oscillatoria* and its near allies.

The genus *Hæmatococcus* of Agardh seems only separable from *Palmella* by the friable or frustulose substance of the species.

Named by Lyngbye, from the Greek, παλμὸς, *vibration*, probably in allusion to the gelatinous character of the plants.

PALMELLA PROTUBERANS. *Soft shapeless Palmella.* TAB. **2552.**

Thick, irregularly lobed, very soft, green. Granules elliptical.

Ulva protuberans, *E. B.* 2583. Palmella protuberans, *Agardh Syst. Alg.* 14. *Greville Crypt. Fl. tab.* 243. *fig.* 1. *Hooker Crypt. Part* 1. 396.

First found by Mr. Borrer, growing among mosses, on wet, shady parts of the sand-rocks, at Uckfield, Sussex. Not a common production. It consists of an assemblage of thick, fleshy, juicy, angular or wrinkled lobes, of a light, pellucid-green colour. Granules about the diameter of poppy-seed, but elliptical, darkish-green, scattered separately throughout the internal substance, as well as copiously prominent above the surface, from which, when ripe, they easily separate on being touched.

PALMELLA cruenta. *Purple Palmella. Gory Dew.* Tab. 2553.

Stratum very thin, diffuse, indeterminate, shining, dark blood colour.

Tremella cruenta, *E. B.* 1800. Palmella cruenta, *Agardh Syst. Alg.* 15. *Greville Crypt. Fl. tab.* 205. *Hooker Crypt. Part* 1. 396.

Very common about the lower parts of walls in damp, shady situations, even in the streets of close towns, during the wet winter months: frequent likewise within doors, on the white-washed walls of cellars, dairies, and outhouses: often on the ground, on gravel-walks in gardens, and on hard-trodden paths, where it is most conspicuous after rain. It forms broad, indeterminate patches, of a deep blood-red or purple colour, with a shining surface, as if blood or red wine had been poured over the stone or ground. When examined with a microscope, it presents the appearance of a congeries of extremely minute, globose masses, filled with subovate granules.

The appearance of this curious plant has doubtless, together with that of *Protococcus* and others of similar colour and structure, contributed at times to verify the vulgar belief in the occurrence of showers of blood, in the form of hail, snow, rain, or dew. In dry weather it loses its colour, contracts, curls up, and is unnoted, but seems to recover at once by becoming wet, and to extend itself rapidly. "Its history," observes the author of the Berwick Flora, "affords an easy explanation of a phænomenon considered supernatural by the monkish chroniclers, and to which Drayton, in his notes to Polyolbion, refers:—'In the plain near Hastings, where the Norman William, after his victory, found king Harold slain, he built Battle Abbey, which at last, as divers other monasteries, grew to a town enough populous. Thereabout is a place which, after rain, always looks red, which some have attributed to a very bloody sweat of the earth, as crying to heaven for revenge of so great a slaughter.'"

PALMELLA montana. *Mountain Palmella.* Tab. 2554.

Between gelatinous and coriaceous, dark reddish-purple, variously lobed and curled. Granules crowded, frequently quaternate.

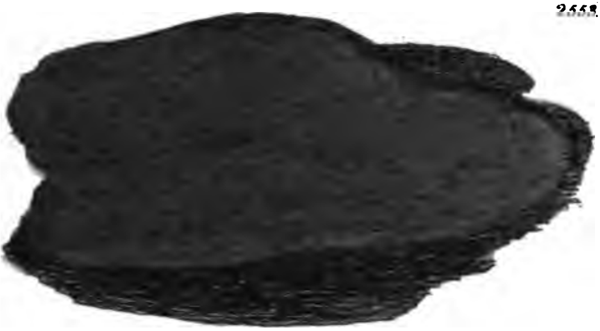
Ulva montana, *Lightfoot.* *E. B.* 2193. Palmella montana, *Agardh Syst. Alg.* 14. *Hooker Crypt. Part* 1. 396. P. alpicola, *Lyngbye Hydroph. Dan. tab.* 69.

Frequent on the mountains of Scotland, especially those of the western Highlands and Isles, growing, or rather lying on the ground in moist, stony places, and among moss and grass. The fronds consist of several ascending, flattish, rounded, occasionally notched lobes, which support each other, and differ in breadth from half an inch to two or three inches. Their substance, when moist, is rather coriaceous, but soft and pulpy, besprinkled internally with fine granulations, which, though immersed, project so as to raise the surface and render it rough.

"On the mountains of Arran, this lies unattached among loose wet stones, covering them in a straggling manner to a considerable extent. Each frond is an inch to an inch and a half in diameter, flattish, somewhat orbicular, between coriaceous and gelatinous,

1800

2558



Palmella cruenta?

Oct.1.1807. Published by Jas. Sowerby London.

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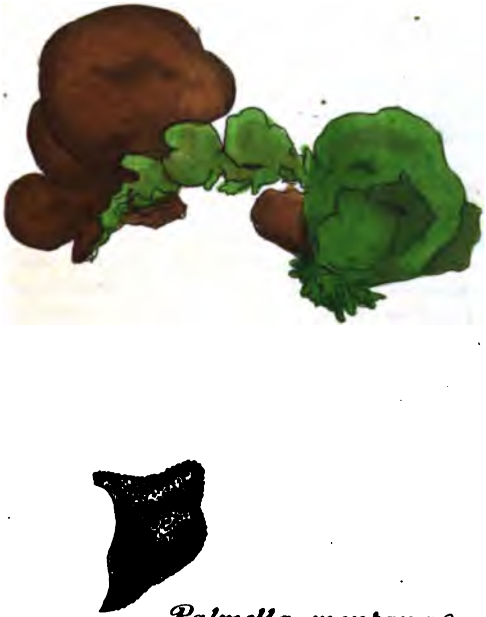
2554



Palmella montana.

[illegible] published by J. D. C. Sowerby London

when dry almost horny, of a deep but dull purple colour, much lobed and curled, like some *Gyrophoræ*, filled with crowded clusters of granules, which, if minutely examined, are found to be mostly arranged in fours."—*Hooker*.

In Scotland it is called Mountain Dulse, and, according to Lightfoot, "the Highlanders wash it, and rub it between their hands into some water, so as to make a thin pulpy mixture, with which they purge their calves."

PALMELLA BOTRYOIDES. *Small clustered Palmella.*

"Minute, fronds densely crowded, globose or somewhat lobed (in consequence of mutual pressure), green. Granules elliptical."

Palmella botryoides, *Lyngbye*. *Agardh Syst. Alg.* 14. *Greville Crypt. Fl. tab.* 243. *fig.* 2. *Hooker Crypt. Part* 1. 396. Byssus botryoides, *Hudson*.

Common on moist heaths and moors. The term *frond*, applied to the globules in this species by Dr. Greville, in the above description, is scarcely consistent with their character, which approaches that of the vesicles of *Protococcus*, or perhaps they are more nearly allied to those of *Lepraria viridis*, *Chlorococcum vulgare* of his 'Cryptogamic Flora;' indeed, it is to me doubtful whether the present is not a modification of that very common lichenaceous production, arising from the moister habitat in which it is developed.

The appearance under the microscope is that of a number of green globules, of various sizes, heaped upon each other without order, and here and there distorted by their mutual pressure.

Several other native species, differing from the foregoing in the globose form of their granules, are referred to this genus: see Hooker Crypt. Part 1. 397–398, and the 'Cryptogamic Flora' of Dr. Greville.

GENUS DCXCI. ECHINELLA. *Echinella.*

GEN. CHAR. Minute, hyaline, gelatinous bodies, filled with radiating elliptical corpuscules.

A very equivocal genus of fresh-water productions, having much the appearance of radiate animalcules, and probably belonging properly to the animal kingdom, though yet retained by naturalists in the vegetable. Only one species, *Echinella articulata*, the type of the genus, is figured in this work, and two others, *E. rotata* and *E. oblonga*, are described by Dr. Greville as found by Captain Carmichael of Appin, who has remarked that they are *animals*, if the faculty of locomotion will entitle them to rank as such: no such movement is recorded of *E. articulata*, *Conferva echinulata* of Sir J. E. Smith;

but in the early part of the summer of 1820, the water of a small pool, in a field near Islington, was coloured green with minute globular specks, which, under the microscope, resembled in appearance so nearly the English Botany figure, that, but for the occasionally rapid motion of some of the globules, I should have had no hesitation in referring them to the latter species, to which there is little doubt they belonged, though I threw them aside at the time as *Infusoria*, of which my then confined leisure did not permit the study. The following season the pond was occupied by myriads of a species of *Volvox*, but no traces of the *Echinella*. I record the fact with the view of inducing more general inquiry into the organic productions of stagnant water, yet little known, and which, in many instances within my own observation, vary from year to year, rendering the recurrence of the same species, however numerous its production at any particular period, problematical.

The name *Echinella*, or *little hedgehog*, from the Latin *echinus*, is characteristic of the spine-like processes composing these curious and interesting objects.

ECHINELLA ARTICULATA. *Articulated Echinella*. TAB. 2555.

Verdigris-green, minute; composed of articulated, spine-like filaments, radiating in every direction from a common centre, and forming a globe.

Conferva echinulata, *Smith E. B.* 1378. Echinella articulata, *Agardh Syst. Alg.* 16. *Hooker Crypt. Part* 1. 398.

Found by the Rev. H. Davies, in a lake in Anglesea. It covers the surface of the water in the months of June and July, and consists of innumerable minute globules of a glaucous or verdigris-green colour, all nearly of the same size. When examined with a microscope, each globule appears to be composed of a number of short, simple, cylindrical filaments, spreading in every direction, and apparently springing from a solid centre. Under a very high magnifier these filaments are found to be formed of short, nearly uniform articulations, nearly of an equal diameter throughout, but gradually diminishing towards the apex.

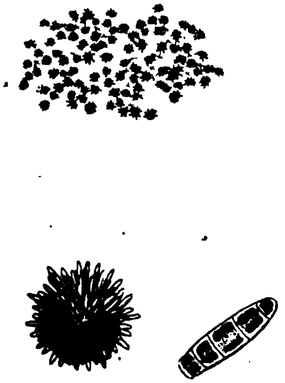
GENUS DCXCII. NOSTOC. *Nostoc.*

GEN. CHAR. A gelatinous or coriaceous, polymorphous substance or frond; filled with crisped, moniliform filaments, which are finally dissolved into sporules.

Terrestrial, or fresh-water productions, of obscure structure, apparently occupying an intermediate grade between the *Algæ* and *Fungi*. The earlier known species were referred by Lin-

1378

2555



Echinella articulata?

Nov.r 1 1804 Published by Ja.s Sowerby London

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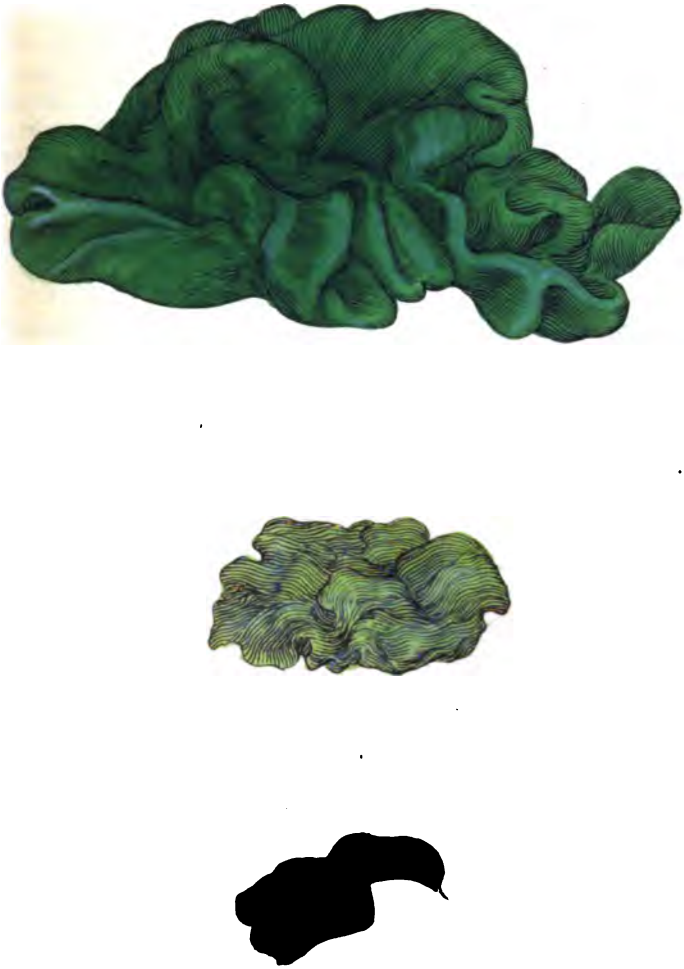


Nôstoc commune?

March 1 1790 Publish'd by J. Sowerby London

næus and others to the equivocal genus *Tremella*, on account of their gelatinous texture, but separated by Vaucher under the above title, assigned to it from *T. Nostoc*, the typical and most common plant of the family: the name originated with Paracelsus, but its derivation is unknown.

The alliance of this genus to *Palmella* I have never been able to discover: there is an occasional resemblance in habit, but the reproductive apparatus is totally different; both of the genera, however, require modification, as in their present state, they are rather receptacles for whatever obscure, gelatinous, supposed vegetable production may come under observation, than assemblages capable of being defined by any positive character. The number of indigenous species of *Nostoc* which have been described is ten, and more than double that number are mentioned as belonging to the genus. We have only one figured in the work before us.

NOSTOC COMMUNE. *Common Nostoc.* TAB. 2556.

Terrestrial. Frond olive-green or brownish, expanded, plaited, waved, polymorphous.

Tremella Nostoc, *Linn.* *E. B.* 461. Nostoc commune, *Vaucher.* *Agardh Syst. Alg.* 18. *Hooker Crypt. Part* 1. 398.

Not uncommon on moist rocks, or on pastures, especially on a gravelly soil; and on gravel-walks in shady gardens, where it often becomes conspicuous after rainy weather, at various seasons of the year. It is of a tender gelatinous substance when in the growing state, very much varied in outline, convoluted, waved and wrinkled, but with a smooth surface, dull green, olive, or brownish. In fair weather, it dries up, becomes black and brittle, and so much diminished in size as to be generally overlooked.

Our figure represents the ordinary aspect of the plant, but it is seldom so large, indeed more frequently very much smaller. The fructification seems not to have been observed either by Sir J. E. Smith or Mr. Sowerby, but is readily discoverable by the microscope, occupying the gelatinous internal substance, in the form of very slender filaments, composed of minute bead like articulations.

This species is very common in the gravelly parts of the kingdom, and being very slightly attached to the ground, has frequently the appearance of a mass of gelatinous matter dropped there by accident; hence, its origin being unknown, in many parts of the country it is supposed by the peasantry to be the remains of a fallen star, or of a Will-of-the wisp.

GENUS DCXCIII. SPHÆROZYGA. *Sphærozyga.*

GEN. CHAR. *Stratum* mucous, containing jointed simple filaments; articulations here and there heteromorphous.

"This very curious genus is allied on the one hand to *Anabaina* and *Nostoc*, and on the other to *Rivularia*: its relation to *Oscillatoria* appears to be more remote. Its resemblance to *Anabaina* is so close that it is highly probable that the two genera will hereafter be united."—M. J. B.

Named from σφαῖρα, *a globe or ball*, and ζυγὸς, *a yoke*, the filaments being mostly composed of globular articulations.

SPHÆROZYGA JACOBI. *Jacobi's Sphærozyga.* TAB. 2817. fig. 2.

Filaments loosely disposed, radiating; heteromorphous joints globose and elongated.

Sphærozyga Jacobi, *Agardh.* M. J. Berkeley in *E. B. Supp. tab.* 2826. *fig.* 2. Nostoc anisococcum, *Sprengel.*

Found by the Rev. M. J. Berkeley, on mud in swampy ground, by the side of a brook at King's Cliffe, Northamptonshire. It consists of a thin, dark-green, more or less mucous stratum, mostly amorphous, but sometimes very obscurely lobed, from which the filaments radiate, as in *Oscillatoria limosa*, in every direction, though to a much less extent. Filaments much curved, or straight, consisting of subquadrate, submoniliform articulations, here and there interrupted or terminated by others which are globose or elongated. Frequently four elongated articulations, with a globose one in the centre, are interposed. The substance which connects the articulations is so transparent that the above able observer was unable to detect its outline under a magnifying power of 600 diameters.

TRIBE XXIII.

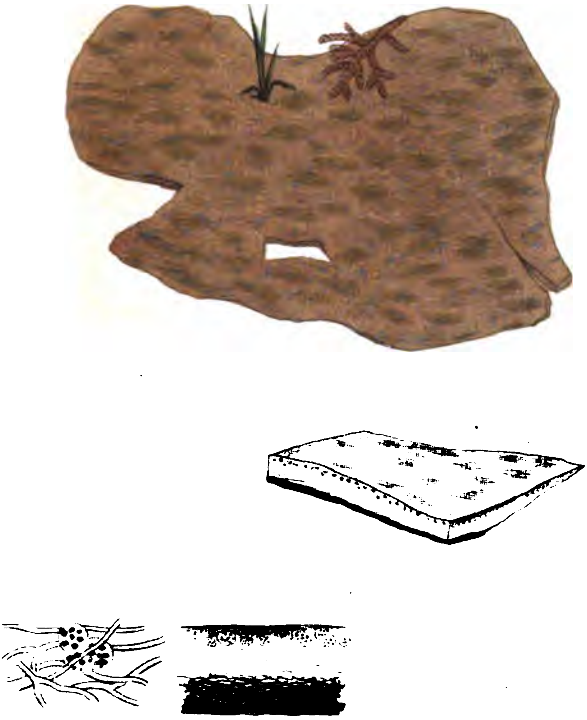
GENUS DCXCIV. SCYTHYMENIA. *Scythymenia.*

GEN. CHAR. *Frond* tough, coriaceous, spreading, its surface reticulated with raised, irregularly anastomosing veins; entirely composed of byssoid, branched fibres, intermixed with granules.

The very anomalous structure of the solitary species referred by Agardh to this genus, induces me for the present to place it as the representative of a separate tribe, rather than retain it as an awkward appendage to the *Nostochineæ*, with which it has certainly not the slightest affinity. Mr. Harvey thinks it would range better with the *Byssoideæ*.

The name, from σκῦτος, *leather*, and ὑμὴν, *a membrane*, is expressive of the texture and appearance of the frond.

2194.
2557.



Scythymenia rupestris.

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SCYTHYMENIA RUPESTRIS. *Rock Scythymenia.* TAB. 2557.
Ulva rupestris, *Smith E. B.* 2194. Scythymenia rupestris, *Agardh Syst. Alg.* 30. *Hooker Crypt. Part* 1. 401.

The plate represents a small fragment of the plant, which was two or three feet wide, and spread like a piece of very wet leather, of a jagged indeterminate outline, over the nearly upright face of a rock, bathed with a perpetually trickling rill, at some distance above Tyloge bridge, in Mr. Johnes' grounds, at Hafod, Cardiganshire. It much resembled in thickness and appearance, except in being of a dull-red or greenish-brown hue, a very wet skin of washed-leather, but was far less tenacious, being with difficulty detached entire from the rock. The surface, when recent, was smooth on both sides. "In a dry state, this curious production strongly resembles a piece of thickish light brown leather. The upper surface is very prettily reticulated with raised, irregularly anastomosing veins, which form areolæ from one to three lines in diameter. Under the microscope, it is found on dissection to consist of densely packed, very slender, byssoid fibres, intermixed with minute granules."—*Harvey.*

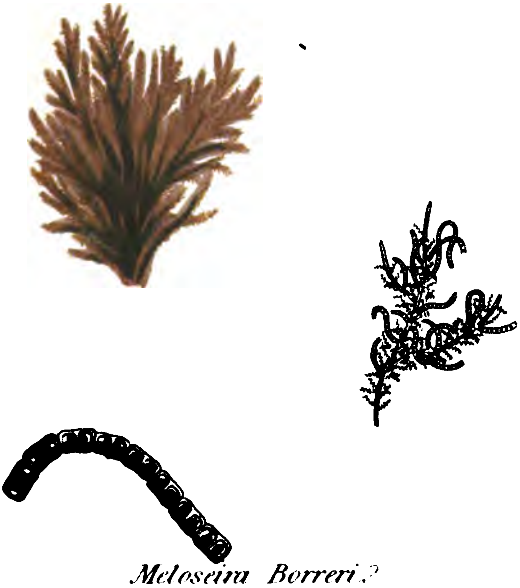
SUBORDER IV. DIATOMACEÆ.

Small, often very minute organic productions, generally regarded as vegetables, but occupying a very equivocal position between the lower confines of the two kingdoms. They are found both in the sea and in fresh-water, and are for the most part parasitic, or at least grow attached to aquatic plants and corallines; but some compose floating masses like those of the simpler forms of *Conferva* and its allies. They consist of a greater or less number of joints or segments, called *frustula*, of various figures, mostly plane or compressed, more or less hyaline or transparent, rigid and fragile, and eventually separating in a definite manner, or, remaining attached, forming polypi-like masses of indefinite extent. Ehrenberg, in his celebrated work on the *Infusoria*, has included these productions, as forming a family of that department of the animal kingdom, under the title of *Bacillaria*; and many modern naturalists entertain a similar opinion. The exterior part or covering in some genera is membranaceous, in others it is horny or shell-like, and contains so much siliceous matter as to retain, after being made red-hot, not only its form, but even the characteristic markings and texture that distinguished the individual; a circumstance of infinite value to the naturalist who is desirous of comparing recent and fossil species. The frustula, cohering in the form of filaments, or variously and sometimes irregularly disposed, are either naked or imbedded in a mucous mass, which is either amorphous as in the genus *Frustulia*, or forms a filamentous tube as in *Schizonema*.

The small number of species figured in the 'English Botany,' and the concise limits of the present edition, will not justify our insertion of the characters of the many genera and species described and figured, as belonging to Britain, by different naturalists, though even these form, probably, only a small proportion of the number yet to be discovered. Those who are desirous of a farther acquaintance with the diversity of structure exhibited by these diminutive agents of the Creator, who, simple and low in the scale of his infinite works as we may deem them, has seen fit, in the secret policy of his om-

2287.

2558.



Meloseira Borreri.?

[illegible] published by Jas. Sowerby London

niscience, to frame them with a complexity that microscopic research is only yet beginning to unravel, may consult, with great advantage to their study, the remarks on the family of *Bacillaria*, and the descriptions and figures of the species, in Pritchard's 'History of Infusoria;' the papers of Mr. J. Ralfs, of Penzance, on the *Diatomaceæ*, illustrated with plates, in the 11th and following volumes of the 'Magazine of Natural History;' the account of the *Diatomaceæ* in Hooker's 'Cryptogamia,' by Dr. Greville; and the beautiful figures of many contained in the 'Cryptogamic Flora' of the latter author, as well as those in Mr. Berkeley's 'British Algæ.'

The researches of Ehrenberg have brought to light some important facts in the history of this extensive class of beings, which render them highly interesting in a geological point of view; the earthy remains of many extinct genera and species constituting, in various parts of the world, strata of such vast extent, that their existence in countless myriads must have been a remarkable feature of the epoch of their production; while the frequent occurrence of similar remains in the more solid accessory mineral formations, especially those of a siliceous nature, as agate, flint, calcedony, &c., tends still farther to evince their important contributions in long past periods to the crust of our planet. Many species likewise, now found in the living state, have their prototypes extant in chalk and other formations of an earlier geological æra.

GENUS DCXCV. MELOSEIRA. *Meloseira.*

GEN. CHAR. *Frustula* siliceous, forming simple, pseudo-articulated filaments, constricted at the articulations, fragile and easily separable.

A genus of small Conferva-like productions found in the sea and in fresh-water. The species are probably numerous. *Oscillatoria ochracea* is referred to it by Mr. Ralfs. Named from *μέλος*, *a part or member*, and *σειρὰ*, *a chain*, in allusion to the appearance of the filaments. It is the genus *Gallionella* of Ehrenberg and Pritchard.

MELOSEIRA BORRERI. *Mr. Borrer's Meloseira.* TAB. **2558.**

Filaments moniliform, very fragile. Frustula united in pairs, rather longer than broad, cylindrical, rounded at the ends.

Conferva nummuloides, *E. B.* 2287 (not of *Dilwyn Conf.*, which is a different species, viz. M. nummuloides of *Greville*). Meloseira Borreri, *Greville*. *Hooker Crypt. Part* 1. 401.

Found on various marine Algæ, and not unfrequent on several parts of the coast. Filaments short, simple, pale yellowish brown, tortuous, cylindrical, composed of frustules united in pairs.

GENUS DCXCVI. FRAGILLARIA. *Fragillaria.*

GEN. CHAR. *Filaments* plane, band-like, extremely fragile, composed of rectilinear, siliceous frustula.

The frustules, when separated, have been observed to move slowly in the water, and the band-like filaments to turn themselves round. The species, some of them far from uncommon, are found, partly in fresh-water pools and rivulets, partly in the sea; they are not well-defined, and some of them approach very near to *Diatoma.*

The fragility of the filaments, arising from the loose cohesion of the frustules, gives name to the genus.

FRAGILLARIA PECTINALIS. *Pectinated Fragillaria.* TAB. 2559.

Filaments rigid, attenuated, very fragile. Frustula from three to five times as broad as they are long, striated on the lateral surfaces.

Conferva pectinalis, *Dillwyn Conf. tab.* 24. *E. B.* 1611. Fragillaria pectinalis, *Lyngbye Hydroph. Dan.* 184. *tab.* 63. *Agardh Syst. Alg.* 7. *Hooker Crypt. Part* 1. 403. F. grandis, *Ehrenberg Die Infus.* 203. *tab.* 15. *fig.* 11. *Pritchard Infus.* 220. *fig.* 171?

Frequent in fresh-water pools and ditches, attached to decaying leaves and water plants. Filaments plane from a quarter to half of an inch in length, tapering towards the extremity, pale greyish-green or brownish, often quite pellucid. Frustules variable in their comparative length, but always very much broader. Endochrome generally collected into two irregular lines connected at the extremities and occasionally in the middle likewise, leaving one or two oblong, pellucid spots in the centre of each, often broken into fragments; diversities probably occasioned by the different stages of growth under which it is examined, each frustule having unquestionably an independent development.

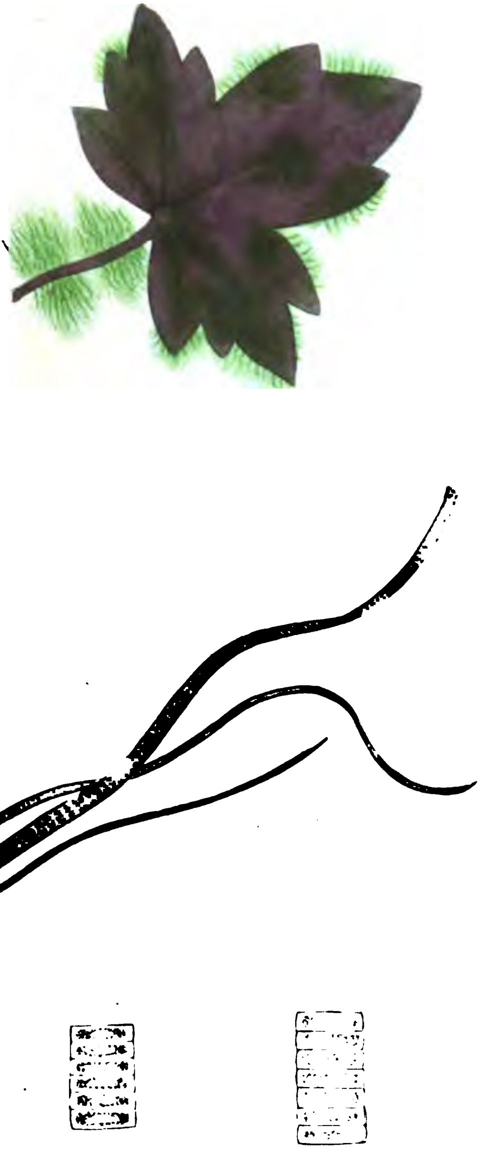
GENUS DCXCVII. ACHNANTHES. *Achnanthes.*

GEN. CHAR. Stipitate, vexilliform; composed of few or many siliceous, more or less convex frustula, which eventually separate, without cohering by their angles.

A very natural genus, whether it be of animal or vegetable nature, well-characterized by the unilateral pedicel, attached to one angle of the basal frustule, which gives the different species the appearance of little standards, especially when the

1611

2559.

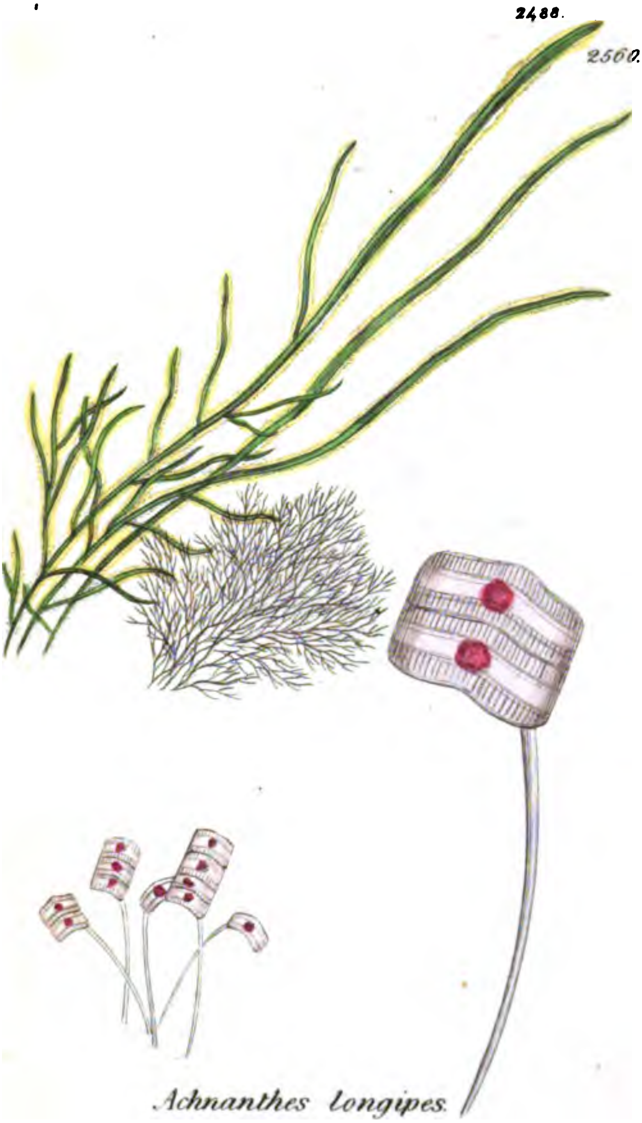


Fragillaria pectinalis.

June 1 1806. Publish'd by Jas. Sowerby Lond.

2488.

2560.



Achnanthes longipes.

[illegible] publish'd by J^s. Sowerby London

Fig. 2.

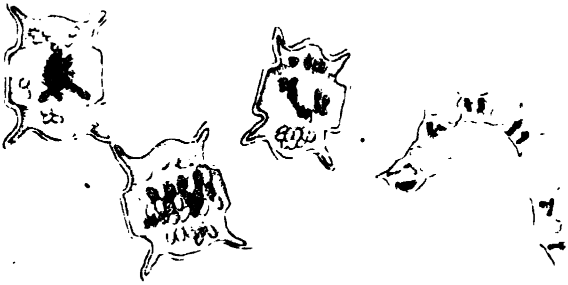
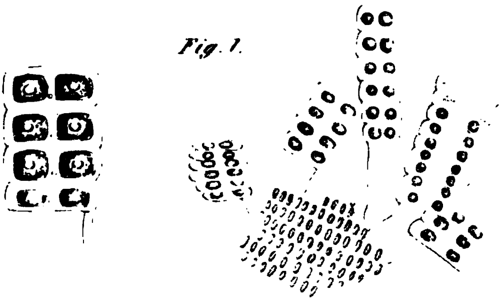


Fig. 1.



Achnanthes brevipes Fig. 1.

Diatoma auritum Fig. 2.

Octr 1st 1840.

frustules are few in number. Named from *ἄχνα*, *froth*, and *ἄνθος*, *a flower*, in allusion perhaps to the resemblance of the clusters to particles of froth settled upon the plant which supports them.

ACHNANTHES LONGIPES. *Long-stalked Achnanthes.* TAB. **2560**.

Stipes long. Frustula striated longitudinally, traversed with a broad white band, with a coloured spot in the centre.

Conferva stipitata, *E. B.* 2488. Achnanthes longipes, *Agardh Syst. Alg.* 1. *Hooker Crypt. Part* 1. 404. *Pritchard Infus.* 232.

Found covering many of the smaller filiform marine Algæ, as on *Ceramium rubrum*, *Conferva ærea*, and occasionally on larger species, as on *Enteromorpha compressa*, &c., giving them an almost golden hue, in the recent state; but when dried, assuming a pale greyish, mucor-like aspect, and feeling soft like cotton. Frustules from one to four, twice or thrice as broad as long, bent upwards in the middle, rounded on the dorsal and ventral surfaces, longitudinally striated, with the interruption of a broad, plain, transverse band: under this band, in the centre of each, and immediately within the curve, is a red, globular, granular mass.

ACHNANTHES BREVIPES. *Short-stalked Achnanthes.* TAB. **2561**, Fig. 1.

Stipes short. Frustula with two coloured spots.

Achnanthes brevipes, *Agardh Syst. Alg.* 1. *Greville Crypt. Fl. tab.* 295. *Hooker Crypt. Part* 404. *Berkeley in E. B. Supp.* 2842. *fig.* 1. *Pritchard Infus.* 232. *fig.* 199–202. Echinella stipitata, *Lyngbye Hydroph. Dan.* 210. *tab.* 70.

Parasitic on various Algæ, but chiefly on the smaller filiform species. Our specimen is attached to *Porphyra vulgaris*. Very minute, resembling a yellowish-green pubescence on the supporting plant. Frustules from one to nine, sometimes much more numerous, transversely linear-oblong, more or less curved in the middle; having at either extremity two oval or round golden yellow spots, the centre of each of which is occupied by a distinct globose corpuscle. Between the spots, at the base, is a single colourless globule, generally wanting in the basal frustule. This colourless globule, as it appears when viewed in a certain position, is really the "oral opening" of those observers who regard these curious productions as *Infusoria*.

The number of frustules composing each little standard is exceedingly variable in this species of *Achnanthes*; Agardh allots two or three, Dr. Greville remarks that he has never met with more than five, and Mr. Berkeley mentions nine as the maximum; but according to Mr. Pritchard, the bands or clusters formed by them are sometimes many inches in length.

GENUS DCXCVIII. DIATOMA. *Diatoma.*

GEN. CHAR. *Frustula* forming pseudo-articulated, plane filaments; eventually separating, but cohering at the angles.

The genus *Diatoma* of Agardh, named from *διατομὴ*, *incision*, in allusion to the imperfect separation of the frustules, which remain attached by their angles, has been, necessarily, much divided by modern naturalists, to whom the improvements made in the microscope during the last few years, have afforded more facile and certain means of research into the structure of these and other minute organic bodies, than were within the reach of their immediate predecessors.

Such considerable differences exist between certain species of the original *Diatomæ*, as well in regard to their modes of propagation, as to their apparent structure, that the above character is rather that of a family than of a genus. Our figures afford examples of four modern genera referable to this type, and distinguished as follows:

Isthmia: Filaments attached. Frustula oblique, trapezoid, cellulose, cohering at the angles by short, neck-like processes. See our *Diat. obliquatum.*

Biddulphia: Filaments attached. Frustula quadrilateral, minutely reticulated, cohering by their alternate angles, and thus forming a zigzag chain; the angles equal, elongated into tooth-like projections. *D. Biddulphianum. D. auritum.*

Striatella: Filaments attached by a stipes, standard-like. Frustula cohering by their angles, transversely striated. *D. striatulum.*

Diatoma: Filaments free. Frustula quadrangular, partially separating and cohering by the angles, generally by the alternate ones. *D. marinum? D. flocculosum.*

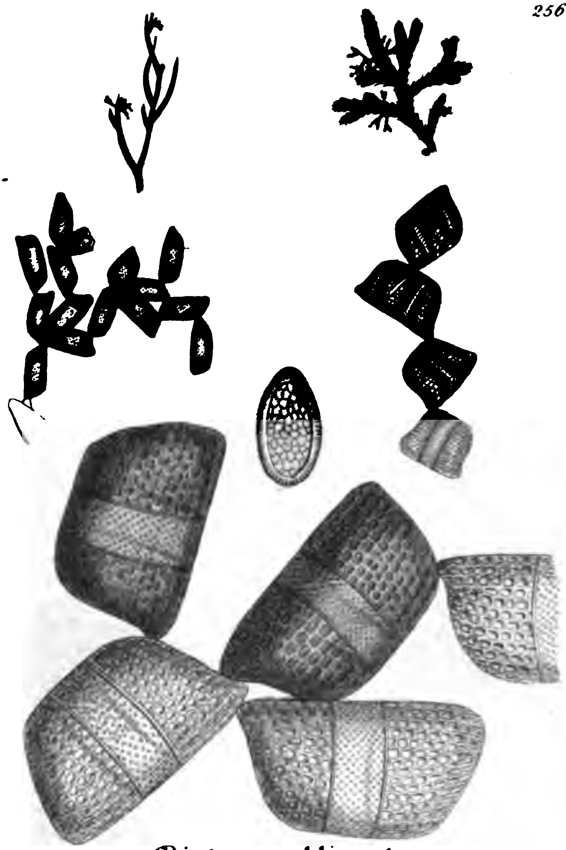
In *Isthmia* and *Biddulphia* the mode of propagation is different to that observed in the *Diatomaceæ* generally: instead of the frustules dividing, two new ones "are formed within the old one, and as they enlarge, rupture it, when it falls off."

DIATOMA OBLIQUATUM. *Oblique-jointed Diatoma.* TAB. 2562.

Filaments short, unequal. Frustula rounded, oblique, half as long again as they are broad, punctate or reticulated, with a central, transverse, punctate band.

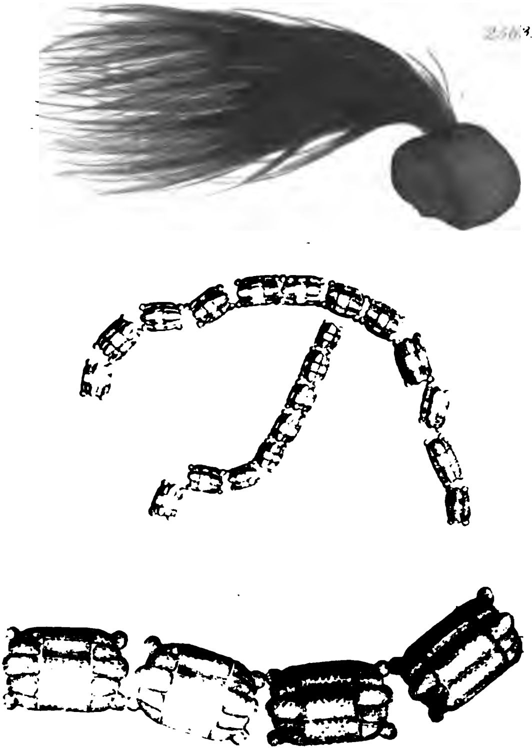
Conferva obliquata, *E. B.* 1869. Diatoma obliquatum, *Lyngbye Hydroph. Dan.* 181. *tab.* 62? *Agardh Syst. Alg.* 6. *Hooker Crypt.*

2562.



Diatoma obliquatum.

2563.



Diatoma Biddulphianum.

Part 1. 405. Isthmia enervis, *Ehrenberg Die Infus.* 209. *tab.* 16. *fig.* 6. *Pritchard Infus.* 223. *fig.* 183.

Found on many of the smaller marine Algæ. It forms small brownish-white tufts, as represented in our two upper figures on fragments of *Gigartina subfusca* and *Cladostephus verticillatus.* The frustules do not always cohere by their alternate angles, but often irregularly.

The figure substituted on our plate for the large magnified one of the first edition, is a very correct microscopic representation of the specimen from which it was taken, and accords very nearly with that of *I. enervis*, given by Mr. Ralfs, in the 12th vol. of the Magazine of Natural History, though scarcely with Mr. Pritchard's above quoted; the principal difference, however, being in the comparative length and breadth of the frustules. Though retaining for the present the specific name originally conferred on the British plant by Sir J. E. Smith, I cannot but admit that expediency points to the adoption of that of Ehrenberg, as remarked by Mr. Ralfs in his admirable paper in the Magazine already mentioned, to which I must refer the reader of English Botany for much valuable information on this tribe generally, which our limits will not permit me to transcribe or even to abridge.

DIATOMA BIDDULPHIANUM. *Miss Biddulph's Diatoma.* TAB. **2563.**

Frustula distinctly reticulated; lateral surfaces with one or three rounded projections between the angles, and marked with a few distant striæ, which appear to arise from depressions between the projections.

Conferva Biddulphiana, *E. B.* 1762, upper figures. Diatoma Biddulphianum, *Agardh Syst. Alg.* 5. *Hooker Crypt. Part* 1. 405. Biddulphia pulchella, *Gray Nat. Arr. Brit. Pl.* 1. 294. *Ralfs.*

Found by Miss Biddulph, at Southampton, growing on various filiform Algæ, and since, in other places on the southern coast of England and Ireland, but not common. Filaments about half an inch long. Frustules of variable proportions; very beautiful microscopic objects.

The plate has been re-engraved, and the large magnified figure presents a very correct view of the frustules, as they appeared under the microscope.

DIATOMA AURITUM. *Auriculated Diatoma. Wool-pack Diatoma.* TAB. **2561.** Fig. 2.

Frustula very minute, quadrilateral, rounded, with an auricle at each angle; cellulose structure indistinct; lateral portions without striæ.

Odontella aurita, *Agardh Consp. Crit. Diat.* 56. *Berkeley in E. B. Supp.* 2842. *fig.* 2. Diatoma aurita, *Lyngbye Hydroph. Dan.* 182. *tab.* 62. *Agardh Syst. Alg.* 6. *Hooker Crypt. Part* 1. 404. Biddulphia aurita, *Ralfs.*

Not unfrequent, as a parasite, on many of the smaller filiform Algæ, on which, though very minute, it is readily recognized by its golden yellow hue. The frustules vary from nearly square to twice as long as broad. Between the angles is a little convex projection.

"It will be observed that this species differs from the last in the absence of striæ, in its smaller size, in the obscure reticulations of the frustule, and by the constriction at the junction of the lateral portions with the central one."—*Ralfs.*

DIATOMA STRIATULUM. *Banded Diatoma.* TAB. 2564.

Filaments elongated, curved, attached by a short stipes at one of the lower angles of the basal frustulum. Frustula tabular, about as long as broad, transversely striated, cohering by their angles.

Conferva striatula, *E. B.* 1928. Diatoma striatula, *Agardh Syst. Alg.* 6. *Hooker Crypt. Part* 1.405. D. arcuata, *Lyngbye Hydroph. Dan.* 180. *tab.* 62. Striatella arcuata, *Agardh. Ehrenberg Die Infus.* 229. *tab.* 20. *fig.* 6. *Pritchard Infus.* 233. *fig.* 203, 204.

Common on various marine Algæ and corallines. Filaments often from half an inch to an inch in length, but occasionally with only one or two frustules remaining on the stipes, when the striated surface will distinguish them from *Achnanthes*; pale green or yellowish when recent, whitish when dry. Stipes very short and thick compared with the size of the filaments.

DIATOMA MARINUM. *Tape-worm Diatoma.* TAB. 2565.

Filaments attached by a short stipes. Frustula varying from square to six times as broad as long; canal not inflated; striæ two.

Conferva tæniæformis, *E. B.* 1883. Diatoma marinum, *Lyngbye Hydroph. Dan.* 180. *tab.* 62. *Hooker Crypt. Part* 1.406. *Agardh Syst. Alg.* 5. Tessella interrupta, *Ehrenberg*? *Pritchard*? Striatella tæniæformis, *Ralfs Mag. N. H.* 12. 456.

A frequent parasite on the *Polysiphoniæ*, *Confervæ*, and other filiform Algæ, on most parts of the coast, especially in the winter and spring months. No species is more variable in its aspect, markings, and comparative length and breadth of the frustules. The short filaments resemble to the naked eye a pulverulent coating, of a brown or greenish hue, over the supporting plant.

Mr. Ralfs refers this to *Striatella*, in consequence of the filaments being attached, as in that genus, by a stipes.

DIATOMA FLOCCULOSUM. *Flocculose Diatoma.* TAB. 2566.

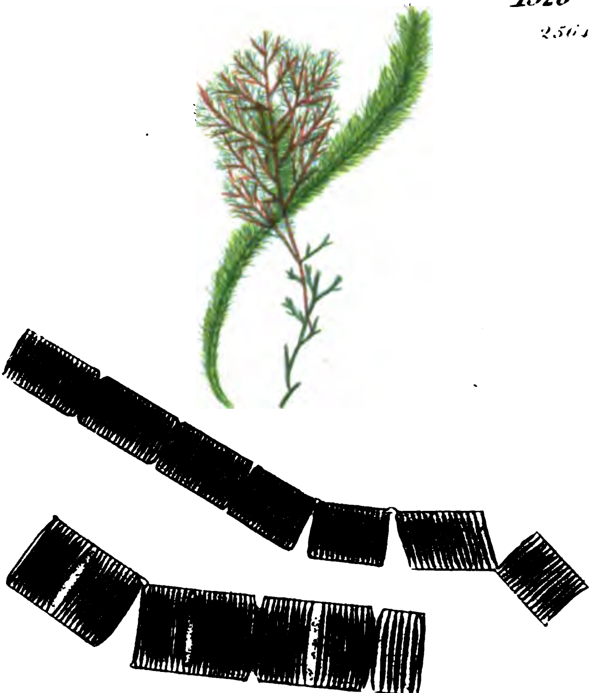
Filaments free. Frustules varying from square to twice as long as broad; striæ three to seven; central canal inflated.

Conferva flocculosa, *Roth. Dillwyn Conf. tab.* 28. *E. B.* 1761. Diatoma flocculosa, *Agardh Syst. Alg.* 4. *Hooker Crypt. Part* 1. 407. Bacillaria tabellaris, *Ehrenberg Die Infus.* 199. *tab.* 15. *fig.* 7? *Pritchard Infus.* 218.

Accompanying various *Confervæ*, in ponds, ditches and slow rivers, and very common during the spring and summer months. Filaments brownish-green, pale when dry, about a quarter of an inch long· frustules variable in length in the same filament, marked with from

1928

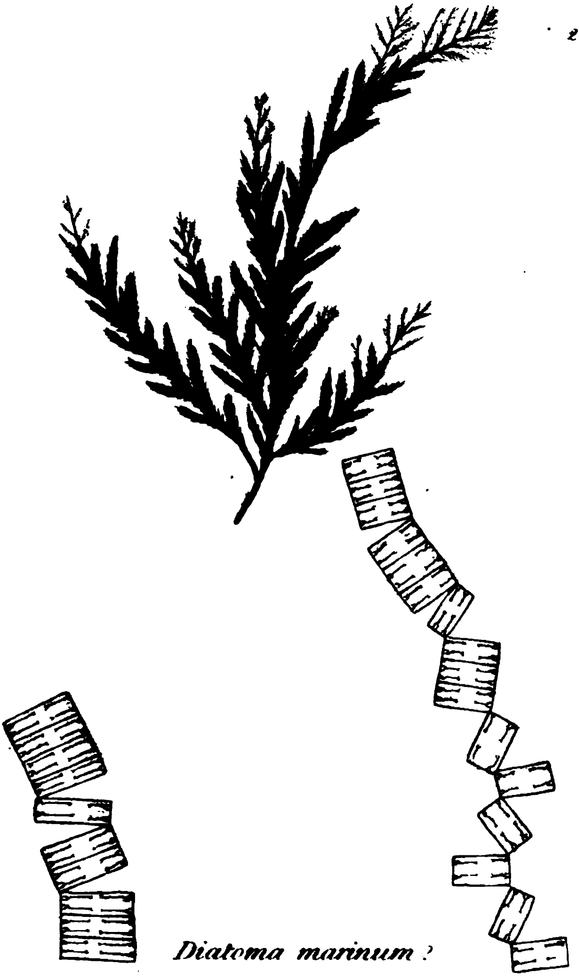
2564.



Diatoma striatulum

Sept 1 1808, Publish'd by Jas Sowerby London

2565.

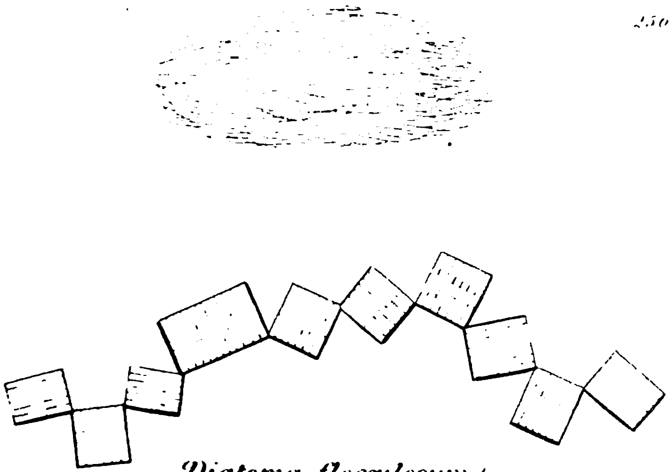


Diatoma marinum ?

May 1.1808. Published by Ja.s Sowerby London.

1761

2506



Diatoma flocculosum

[illegible]

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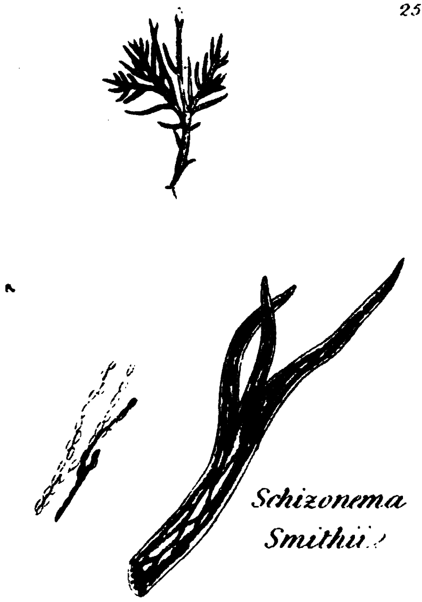
2567



Schizonema
Smithii.

Jan 1 [illegible] published by J. Sowerby London

three to seven parallel, transverse striæ, and a central, longitudinal white or pellucid line (canal).

GENUS DCXCIX. SCHIZONEMA. *Schizonema.*

GEN. CHAR. *Frustula* in longitudinal series, inclosed in a simple or branched, filiform, mucous or membranaceous tube.

Numerous small marine productions, some parasitic on the smaller species of Algæ, others growing on rocks, and on the woodwork of piers and sluices, are referred to this genus. In habit they resemble at first sight small Confervæ or Corallines, but microscopic examination discovers a structure, that has induced naturalists generally to consider them more or less allied to the *Diatomaceæ.* The filaments consist of a mucous or mucilaginous tube, including minute granules or frustules variously disposed in longitudinal series, and are generally branched irregularly towards the extremity. The name, from *σχίζω, to divide*, and *νῆμα, a thread*, alludes to the division of the filaments by the separation of the frustules.

SCHIZONEMA SMITHII. *Smith's Schizonema.* TAB. **2567.**

Filaments tufted, gelatinous, irregularly branched; branches spreading, acute. Frustula oblong, in numerous parallel series, geminate, at length separating.

Conferva fœtida, *Dillwyn Conf. tab.* 104. *E. B.* 2101. Schizonema Smithii, *Agardh Syst. Alg.* 10. *Greville Crypt. Fl. tab.* 298. *Hooker Crypt. Part* 1. 414. Ulva fœtida, *Vaucher Conf.* 285. *tab.* 17. *fig.* 3.

Not uncommon, at least on the south-eastern shores of England, growing on rocks, or attached to various Algæ, and sometimes in salt-marshes, as at Cley, Norfolk, and about Sandwich. The flaccid, slippery filaments, of a pale brown, greenish, or yellowish hue, form tufts from one to three inches in length, adhering laterally together in the lower part, separating and branching off, as it were, above in an irregular manner, the divisions terminating acutely: they vary in thickness according to the number of smaller filaments united in the mass, each of which contains a single series of granular frustules, that, however, sometimes branch out laterally within and apparently anastomose with each other. It has a fetid animal odour, especially after remaining a little while out of the water.

APPENDIX.

FUNGI.

The only figures belonging to this order of plants, published in the 'English Botany,' are those of the genus *Tremella*, at that period a very incongruous assemblage of species, agreeing only in the obscurity of their structure, amorphous outline and gelatinous substance, and in regard to the nature of which few botanists coincided in opinion. In most of the earlier botanical works they were placed among the Algæ, or occupying an intermediate grade between them and the Lichens. The stricter investigation to which they have been since subjected, has shown, that while a few of the original species accord with the lower forms of the Algæ, and others do not belong to the vegetable kingdom, the bulk of the genus must be regarded as *Fungi*.

The small number of species now before us, and those appertaining only to two or three minor sections of a vast tribe, the individuals of which are characterized by an amazing variety of structure, renders it unnecessary to enter here into those preliminary details, which the introduction of a more extended series or more diffuse generic illustration would require. The few following plates are republished as an integral portion of the original work, which, frequently referred to by botanical authors on account of the figures, would if withheld render the present edition incomplete.

The *Fungi* are almost universally developed on diseased, dead, or decomposing organic substance.

GENUS DCC. TREMELLA. *Tremella*.

GEN. CHAR. *Plant* gelatinous, homogeneous, bearing fruit *all round*, destitute of papillæ. Sporidia subemergent.

The original genus has been greatly reduced in extent, even as regards the allotment of the fungoid species, of which we have examples in the three following genera. The name was first adopted by Dillenius, from the Latin *tremo*, *to shake*, on account of the tremulous motion of the jelly-like masses when agitated.

TREMELLA FERRUGINEA. *Plaited rusty Tremella.* TAB. 2568.

Sessile, clustered, lobed and plaited, deep red-brown; the surface finely pubescent.

Tremella ferruginea, *Smith E. B.* 1452. !*Withering* 4. 69. *Berkeley in Hooker Crypt. Part* 2. 215.

Found on dead wood, at Lakenham, near Norwich, and elsewhere, as in the vicinity of Eltham, Kent, and near Tunbridge. Substance tender and pliable, becoming thin, shrivelled, and shapeless when dry, reviving imperfectly on the re-application of moisture, hence most conspicuous in wet weather. The segments are obtuse, lobed, and waved, but not so plaited or sinuous as those of *T. mesenterica*, Tab. 2569; neither is the surface, as in that species, smooth, but finely pubescent or granulated, the granulations pale, giving the plant a velvet-like gloss, with brown irregular specks, perhaps of fructification, among them. The internal substance is white.

Bulliard's tab. 499. fig. 6. X, which he considers as a variety of *T. mesenterica*, most resembles our plant; but that is smooth, with a violet tinge, giving out a fine red-brown colour to water, when macerated, all of which is inapplicable to the present species.

TREMELLA MESENTERICA. *Plaited yellow Tremella.* TAB. 2569.

Sessile, plaited, lobed, waved, rather tough, orange-yellow.

Tremella mesenterica, *Retz. E. B.* 709. *Withering* 4. 79. *Berkeley in Hooker Crypt. Part* 2. 216. T. chrysocoma, *Bulliard tab.* 174.

Frequent, throughout the year, on the dead branches of trees, or on decayed stumps of broom and furze, sticks, hurdles, &c., varying considerably in size and form, and from a pale yellowish-white to a deep orange colour, according to age and exposure to the light; occasionally it is flat and thin. In dry weather, or when gathered and laid by, it shrinks considerably, becomes darker-coloured, hard and firm, but revives with moisture. Like other species of the genus, it is nearly devoid of taste and odour. The substance seems to consist entirely of branched filaments, the apices of which meet at the surface, bearing there "a dense stratum of roundish, very minute sporules."

It yields a yellow colouring matter capable of being employed as a dye.

TREMELLA ALBIDA. *Whitish Tremella.* TAB. 2570.

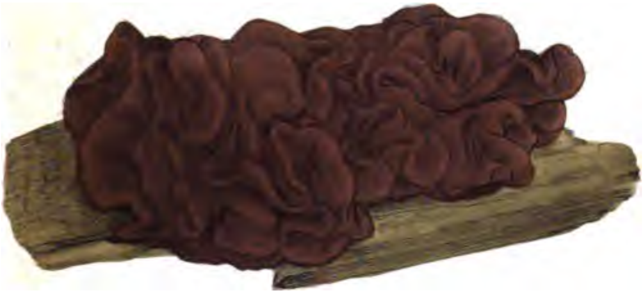
Sessile, dilated, slightly lobed and waved, with obtuse extremities, dirty white, pulpy, semipellucid. Sporidia oblong, curved.

Tremella albida, *Hudson. E. B.* 2117. *Withering* 4. 77. *Berkeley in Hooker Crypt. Part* 2. 216.

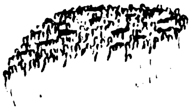
Found on decayed branches of trees in shady woods. It bursts through cracks in the bark, and then spreads itself in horizontal or clustered, rounded, obtuse, scalloped masses, white, semipellucid, extremely gelatinous and tender when young; afterwards becoming yellowish or brown. The surface is densely covered with minute,

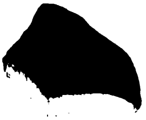
1452

2568.



Tremella ferruginea.





May 1. 1805 Published by Jas. Sowerby London

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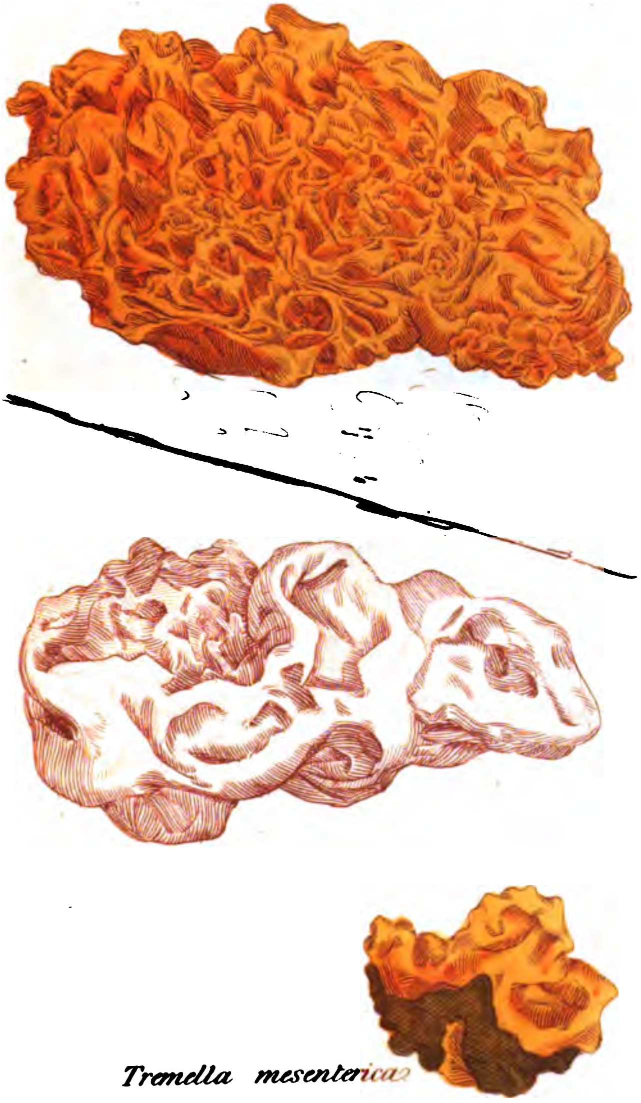
2509



Tremella mesenterica

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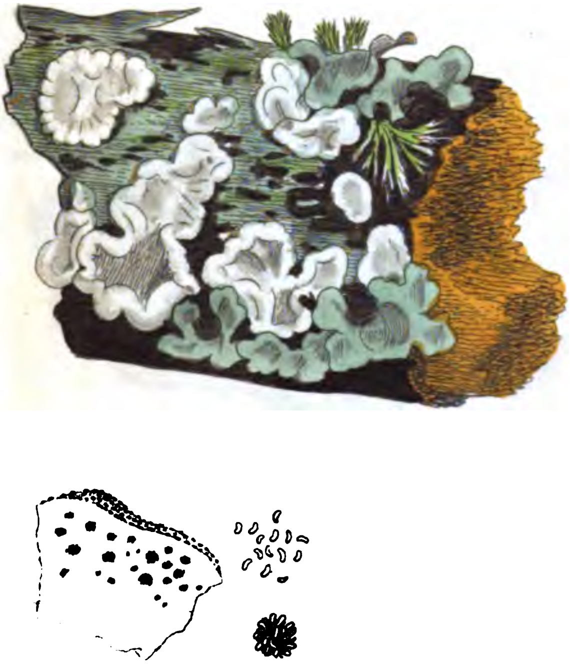
2117

2570



Tremella albida ?

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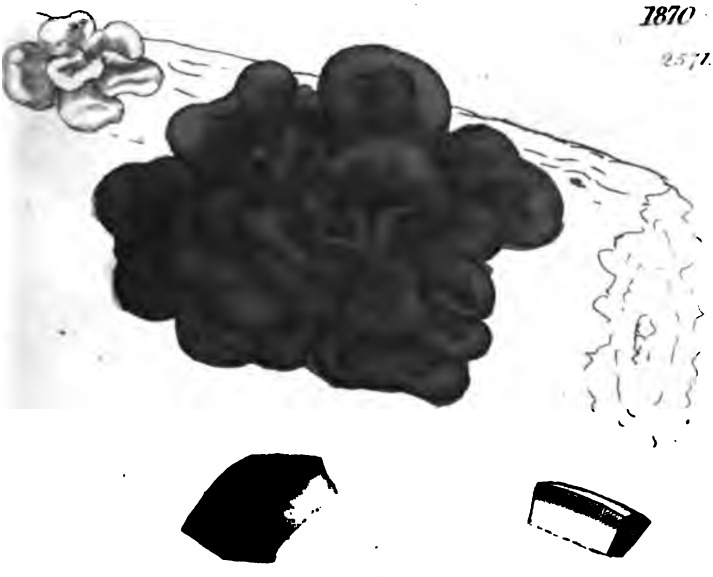
1870

2571.

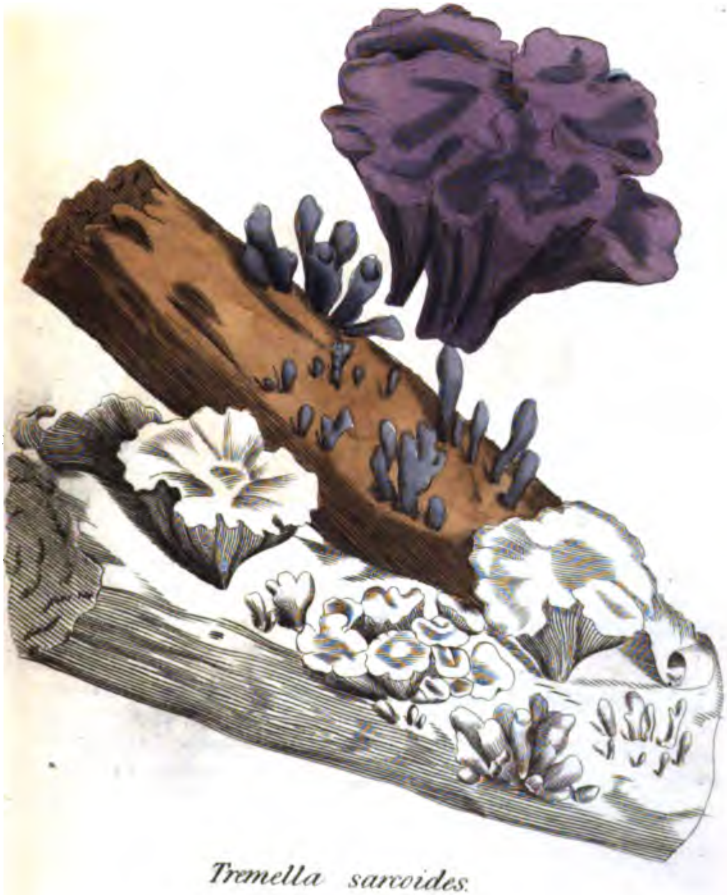


Tremella intumescens.

Apl 1 1808 Publishd by Jas Sowerby, London.

2450.

2572.



Tremella sarcoides.

Aug. 1. 1812, published by Jas. Sowerby, London.

oblong, curved sporidia, and similar bodies are represented as existing in the form of small nuclei in the interior of the mass. "I do not find these to consist of masses of sporidia, as figured, possibly by some mistake, by Sowerby."—*Berkeley in Hooker.*

TREMELLA INTUMESCENS. *Brown tumid Tremella.* TAB. **2571.**

Sessile, clustered, twisted, tumid, brown, shining, gelatinous; when dry, thin and membranaceous.

Tremella intumescens, *E. B.* 1870. *Berkeley in Hooker Crypt. Part* 2. 217.

Found by Mr. Borrer, growing on a beech-tree, in St. Leonard's Forest, Sussex. In perfection in very wet weather only, when it forms numerous roundish, soft and pulpy clusters, twisted and tumid like the intestines of some animal, of a darkish dull brown, but with a shining surface, obscurely dotted. The inside is paler and almost white, except that, when cut longitudinally, brown vertical streaks are observable near the surface. When dry the whole plant becomes a thin membrane.

"I am inclined to think that this is one of the various forms of *Exidia glandulosa*: at least, I have found on a felled, decorticated oak, a production so similar that I cannot but think it identical, which I am pretty certain is a barren or immature form of that plant. It differs only from the figure and description in 'English Botany' in being of a deep cinereous tinge, verging upon black."—*Berkeley in Hooker Crypt.*

TREMELLA SARCOIDES. *Fleshy Tremella.* TAB. **2572.**

Clustered, gelatinous, viscid, of a purplish flesh-colour; at first clavate, afterwards compressed, lobed, and plicate, or approaching to funnel-shaped.

Tremella sarcoides, *Withering* 4. 78. *E. B.* 2450. *Berkeley in Hooker. Crypt. Part* 2. 217. T. amethystea, *Bulliard tab.* 499. *fig.* 5. Helvella sarcoides, *Bolton tab.* 101. *fig.* 2.

Frequent on rotten wood and stumps of trees, in damp shady places during the autumn and winter months. Few of the Fungi are more variable than this in form. On its first appearance, it is somewhat stalked, erect, and club-shaped, but increasing in size soon dilates somewhat into the form of a funnel, but more or less irregular, and broken into variously deformed, rounded or lobed masses. In substance it is semipellucid, gelatinous, with a rather tough and elastic exterior. Its colour is a vinous or purple flesh-colour, becoming dull, and eventually black by age or in decay.

This is liable to be confounded with *Bulgaria sarcoides* of Fries, Hooker Crypt. Part 2. 210; *Peziza tremelloides* of Bulliard, tab. 110. fig. 1; *Tremella amethystea* of Withering 4. 82? an equally common fungus, which it resembles in some of its forms, but is distinguished by its texture being less firm, and by its minute oblong, and mostly curved, free sporidia.

GENUS DCCI. EXIDIA. *Exidia.*

GEN. CHAR. *Plant* gelatinous, homogeneous, covered *above* only with the papillate hymenium*. *Sporidia* at length bursting forth elastically.

This genus differs essentially from *Tremella* in bearing the sporidia on the upper surface only, instead of universally, the papillose character of this part, the hymenium, not being always very obvious. The name, from the Latin *exudo*, was bestowed by Fries, in allusion either to the mode in which the sporules are discharged, or to the apparent *exudation* of the fungus itself from the branch it grows upon.

EXIDIA AURICULA-JUDÆ. *Jews'-Ears.* TAB. 2873.

Sessile, somewhat leathery, auriculate, concave, flexuose, venoso-plicate without and within, beneath subtomentose, reddish-brown or olivaceous.

Tremella Auricula, *Linn. E. B.* 2447. Exidia Auricula-Judæ, *Fries. Berkeley in Hooker Crypt. Part* 2. 217. Peziza Auricula, *Bulliard tab.* 427. *fig.* 2. *Withering* 4. 351.

Not unfrequent upon the decaying branches and stumps of trees, especially of the common elder, generally making its appearance in the autumn and winter. Plant from one to three inches broad, varying from a dark olive to a reddish-brown; the under surface darker, more opake, and roughish; the upper corrugated, the plaits branching from the middle part, where they are strongest and somewhat convoluted, so as to make the lobes resemble, in a greater or less degree, the human ear. When the plant grows on a perpendicular stump or tree, it turns upwards.

It possesses astringent properties, and was formerly in medicinal repute. Its infusion or decoction was employed as a lotion for the eye in ophthalmia, and as a gargle in the relaxed sore-throat.

EXIDIA RECISA. *Small brown Exidia.* TAB. 2874.

Subsessile. Stipes very short, excentric, oblique, enlarging upward into a truncate plane, or somewhat repand, boletiform mass, of a brown colour, smoothish above, rough and punctated beneath.

Tremella boletiformis, *E. B.* 1819. Exidia recisa, *Ditmar. Berkeley in Hooker Crypt. Part* 2. 218. Peziza gelatinosa, *Bulliard tab.* 460. *fig.* 2.

Common on the dead branches of trees, especially of willows and sallows, in the autumn and winter. Plants about an inch broad, nearly sessile, irregularly orbicular, depressed, of various shades of brown; the upper surface unequal, nearly smooth, somewhat shining; the lower rough and dotted. "Sporidia oblong, obtuse, curved, exactly resembling those of *Tremella albida*."—*Berkeley*.

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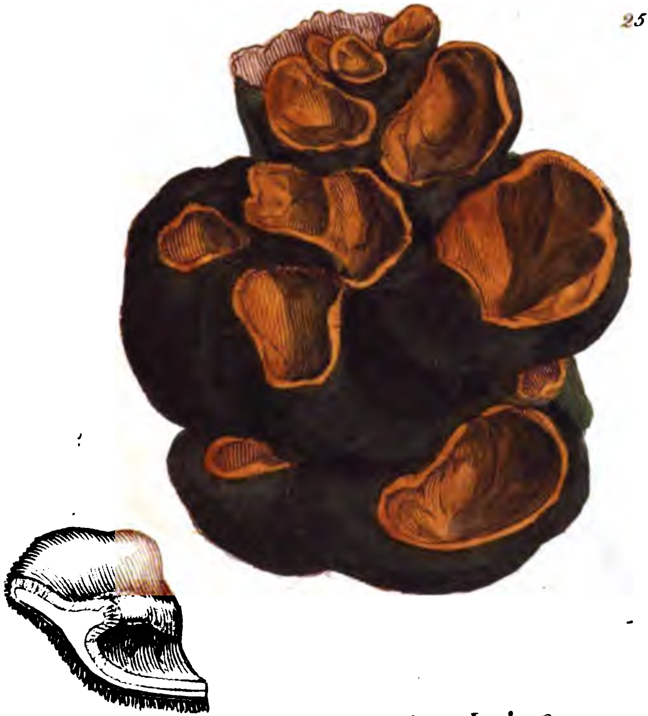
* The part of a Fungus which contains the sporidia or sporules.

2447

2573

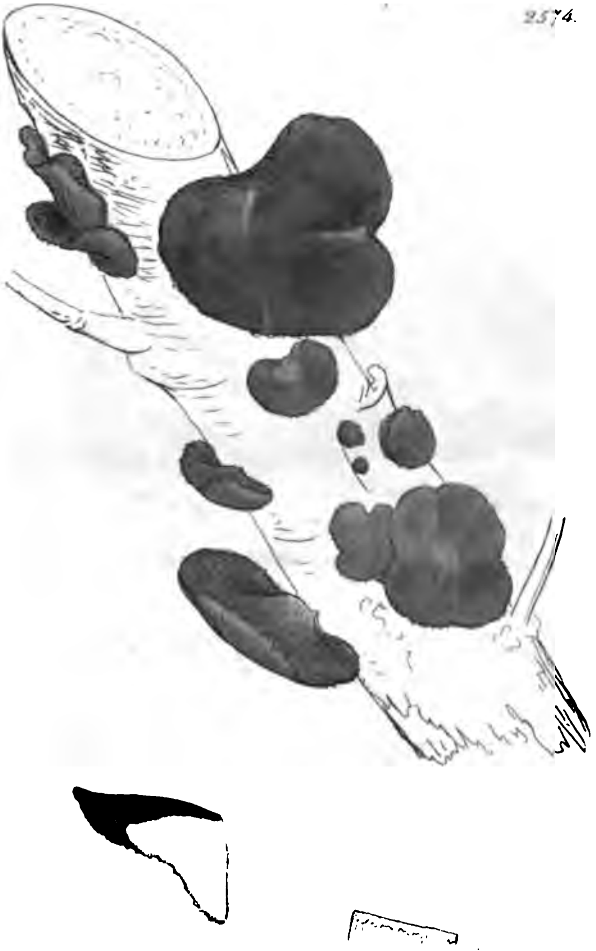


Exidia Auricula Judæ.

[illegible] published by Jas Sowerby London

1819

2574.



Exidia recisa?

Dec. 1. 1807. Publish'd by Ja.s Sowerby London.

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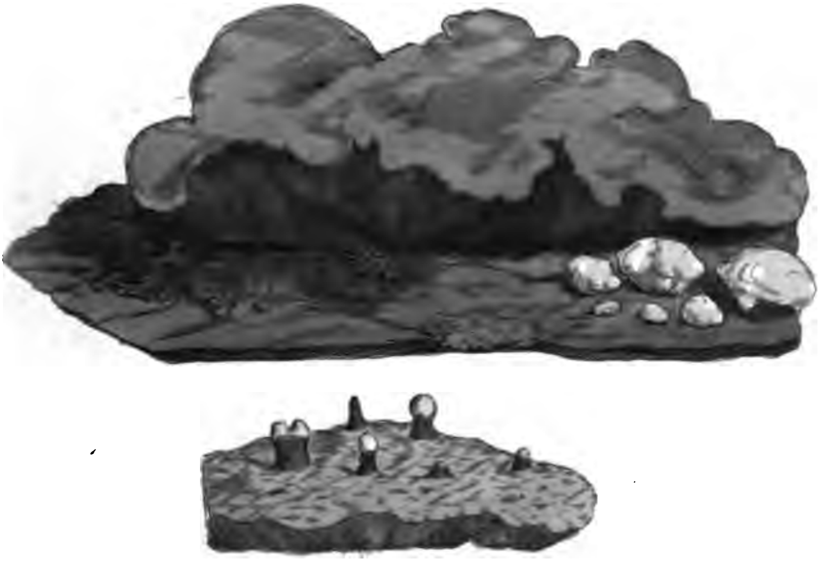

Exidia glandulosa.?

[illegible] published by Jas. Sowerby London

2452

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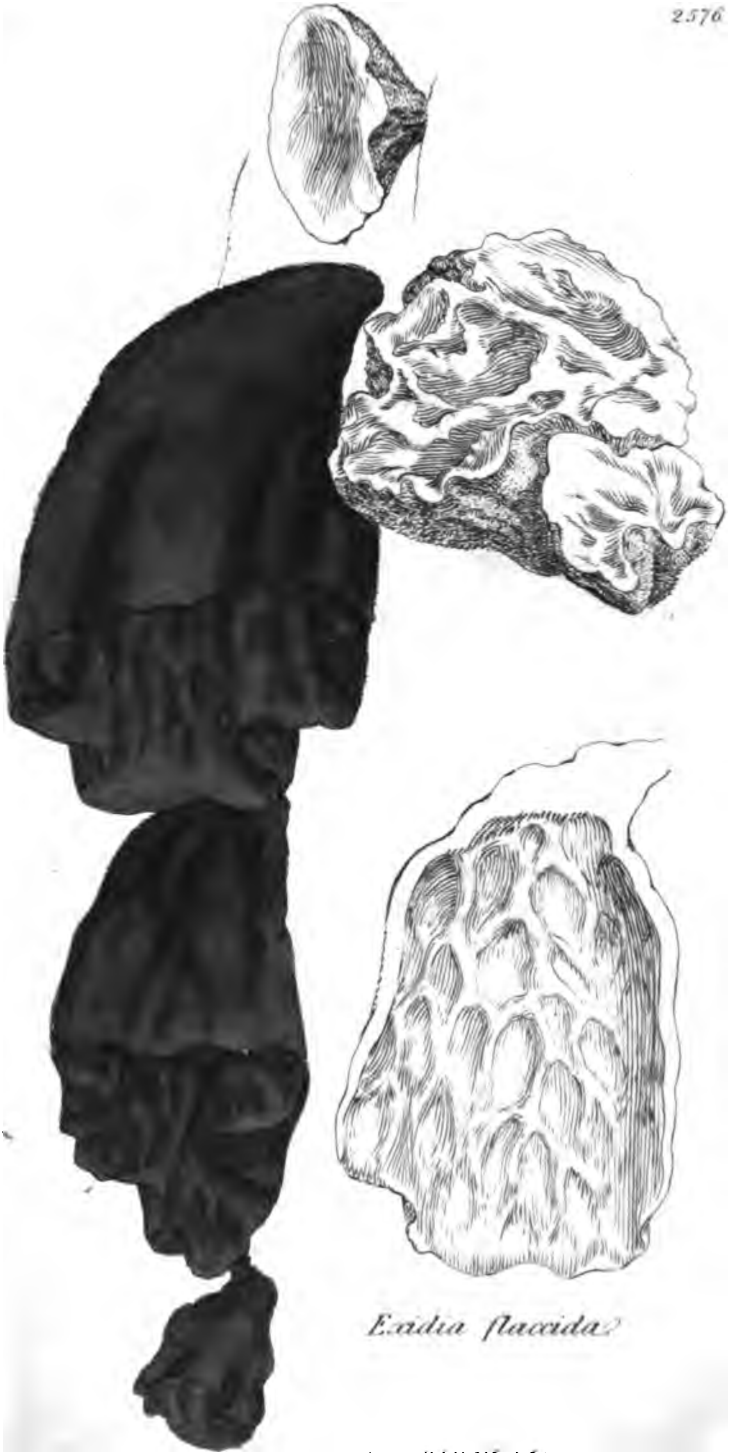


Exidia flaccida

Aug [illegible] published by Jas Sowerby London

EXIDIA GLANDULOSA. *Witches' Butter.* **TAB. 2575.**

Effused, gelatinous, thick, undulated, blackish, beset with conical or mammillary, white-topped processes on the upper side, subtomentose beneath.

Tremella arborea, *Hudson.* *Withering* 4. 78. *E. B.* 2448. Exidia glandulosa, *Fries. Berkeley in Hooker Crypt. Part* 2. 218. Tremella glandulosa, *Bulliard* 420. *fig.* 1. T. spiculosa, *Persoon.*

Common upon fallen trees and dead branches, in the autumn and winter, especially on the ash, alder, and others growing in wet situations. It forms roundish, somewhat turbinated, irregular masses, of a firm gelatinous substance, lobed and wrinkled above, slightly plicate below, of a pale, whitish hue at first, but soon changing to brown, and eventually becoming black. The upper surface bears scattered, erect, short spicules or prominences, each with a black cylindrical base, and a white convex, somewhat hemispherical head. The substance is "composed of gelatine interlaced with very slender branched filaments, indistinctly moniliform under a high magnifier, covered with oblong, obtuse, curved sporidia, between the conical spicules, which are frequently surmounted by a glandular white globule. Beneath, rough like crape, with minute parallel papillæ. Brown specimens, which now and then occur, may be distinguished from the foregoing species by the more highly developed spicules."—*Berkeley in Hooker Crypt.*

In many parts of England it is called "Witches' Butter," because, according to Dillenius, when thrown into the fire, it is believed to be efficacious against witchcraft.

EXIDIA FLACCIDA. *Pendulous Exidia.* **TAB. 2576.**

Tremella flaccida, *E. B.* 2452.

A curious drooping variety of *E. glandulosa,* according to Mr. Berkeley. Found on the perpendicular trunk of an oak in Petersham park, several specimens growing one above another, drooping downward in a bell-shaped manner, so that the external surface of the plant was uppermost: this surface, when fresh, resembled black crape in colour and roughness; the inner or concave side, which should be regarded as the upper, was smooth and somewhat shining, furnished with several vein-like wrinkles.

Mr. Berkeley's reference of this to the preceding species is undoubtedly correct; I have met with several intermediate specimens.

GENUS DCCII. DACRYMYCES. *Dacrymyces.*

GEN. CHAR. *Plant* gelatinous, homogeneous, filled within with suberect flocci and interspersed sporidia.

So called by Nees von Esenbeck, from *δάκρυ, a tear,* and *μύκης, a fungus.* The only species figured here is a very doubtful member of the genus.

DACRYMYCES moriformis. *Mulberry Dacrymyces.* Tab. 2577.

Sessile, clustered into a globular form, sinuated, black, opake, fleshy, deep purple within.

Tremella moriformis, *Smith E. B.* 2446. Dacrymyces moriformis, *Fries. Berkeley in Hooker Crypt. Part* 2. 219.

Found by Mr. C. E. Sowerby, early in June, growing on pales and rails between Hoodly gate and Meastham, Surrey. It grows sessile, in roundish or oblong, tumid, sinuous masses, of various sizes, not unlike mulberries in appearance, except in being coal-black externally; internally, however, they are of a rich deep purple colour. Substance fleshy. Attached to the wood by strong central roots. When dried between paper, a violet stain is communicated to whatever the plant touches.

Genus DCCIII. PODISOMA. *Podisoma.*

Gen. Char. *Sporidia* springing from beneath the cuticle of living plants, mostly uniseptate, stalked; stalks joined together into a common stem; above agglutinated by gelatine into a naked, vertical clavariæform mass.

Named by Link from ποῦς, *a foot*, and σῶμα, *a body*.

PODISOMA Juniperi Sabinæ. *Savine Podisoma.* Tab. 2578.

Red-brown, tuberculiform and clavate.

Tremella Sabina, *Dickson. E. B.* 710. *Withering* 4. 79. Podisoma Juniperi Sabinæ, *Fries. Berkeley in Hooker Crypt. Part* 2. 362.

Not uncommon on the living branches of *Juniperus Sabina*, growing in tooth-like clusters. Substance when fresh gelatinous, leathery when dried. Colour orange-brown.

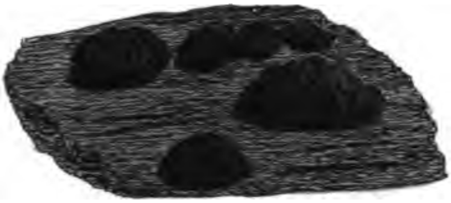
A species not very dissimilar to this grows on the branches of *Juniperus communis*, and another, *P. foliicolum*, is found on the leaves of the same plant. They were once considered to be mere gummy exudations, and Sir J. E. Smith was at first inclined to regard them as such, but the microscope readily discovers their true fungoid character.

ALCYONIDIUM.

The introduction of the animal subjects of the two following plates into the 'English Botany,' at a period when microscopical investigation was but in the infancy of its application in

246

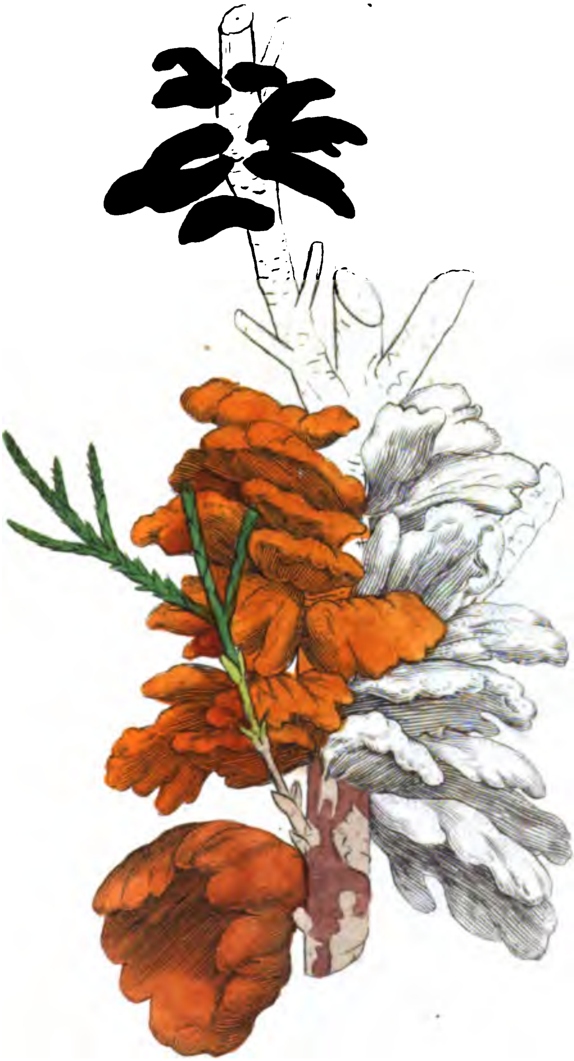
2577



Dacrymyces moniformis.

Aug. [illegible] Published by Jas Sowerby London.

710
2578.

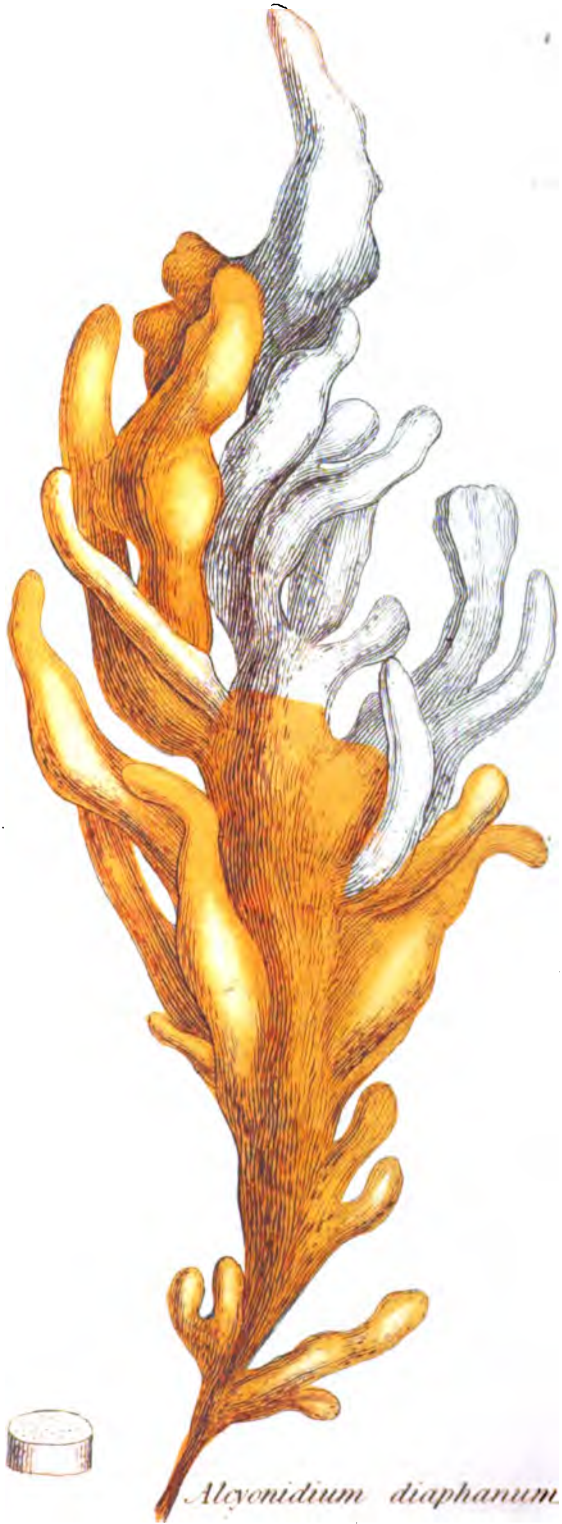


Podisoma Juniperi Sabinæ

March 1 1800 Publish'd by [illegible]

263.

2579



Alcyonidium diaphanum

[illegible]

this country, and especially as regarded the comparison between vegetable and animal structure, needs no apology, even at the present day, though we flatter ourselves with having so far excelled our immediate predecessors as to be justified in looking back with a smile, half of pity, half of vanity and self-assurance, upon their errors; for, with all the advantages accruing from modern experiment and research, we are still in doubt where to draw the line of separation between the two kingdoms of life, as instanced in the diversity of opinion as to the allotment of several genera illustrated in the work before us. The *Alcyonidia* were only a degree more equivocal members of the vegetable kingdom than the *Siphoneæ*, *Oscillatoriæ*, and several other families assigned to it by the almost universal consent of botanists, are now; the movements of the minute polypi inhabiting them require close observation to detect them, and in many instances have not yet been discovered. I have been induced to republish the two plates in question at the conclusion of the work, on account of the common occurrence of the species, the first especially, upon our shores, and with a view of removing the doubts of the tyro who might light upon them in his search after ocean's rarities. By our earlier botanists they were, on account of their sub-gelatinous and otherwise indefinable structure, with the appearance of minute seeds scattered throughout, referred to the old genus *Ulva*, that heterogeneous mixture of everything that was obscure, and at the same time reducible within the limits of the very loose and simple character originally allotted to it.

ALCYONIDIUM DIAPHANUM. *Pellucid Alcyonidium.* TAB. **2579**.

Gelatinous, pale yellowish, pellucid, somewhat cylindrical, with numerous blunt branches of various sizes.

Ulva diaphana, *Hudson. E. B.* 263. *Withering* 4. 121. Alcyonium gelatinosum, *Linn. Syst. Nat.* Fucus spongiosus nodosus, *Ray Syn.* 49. Alcyonidium diaphanum, *Agardh. Loudon Hort. Brit.*

Frequent on most of our shores, being thrown up among the masses of Algæ torn from the rocks in stormy weather. It adheres to the sand or rock by a slender stem-like process slightly dilated at the base like that of the *Fuci*, and seems to be fixed by a sort of paste or mucilage; but is never met with above low-water mark, and hence only obtainable at the times mentioned, or, occasionally, from the trawl nets of the fishermen. From a few inches to a foot or a foot and a half in length, very irregularly branched, fleshy and juicy within, the surface nearly smooth; colour varying from a very pale brown, almost like that of wet sea-sand, to a clear yellow, and then looking like barley-sugar. It is said to be sometimes phosphorescent.

ALCYONIDIUM DEFRACTUM. *Vermicular Alcyonidium.* TAB. 2580.

Filiform, unbranched, elastic, viscid, pellucid, with pale red dots.

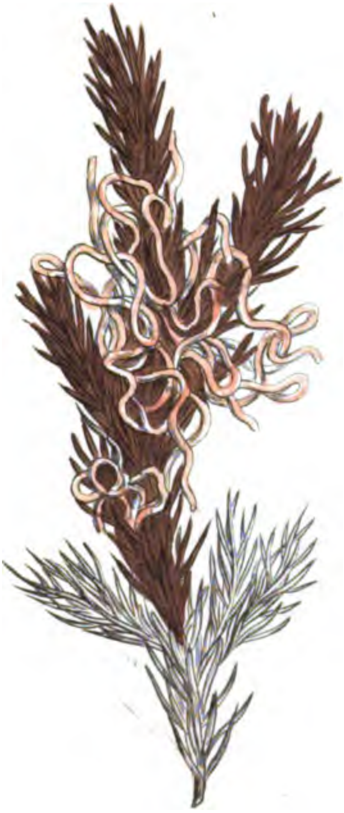
Ulva defracta, *Withering* 4. 124. *tab.* 18. *E. B.* 1626. Alcyonidium defractum, *Agardh. Loudon Hort. Brit.*

Generally found entangled with and apparently growing on the smaller Algæ. Filaments variously twisted together like worms, simple, cylindrical, obtuse at the extremities, very viscid when recent and adhering to each other in drying: pale, pellucid, sprinkled with blush-coloured dots, which in drying change to orange. The filaments vary from the twelfth to the eighth of an inch in diameter, and from two or three inches to a foot in length.

It seems to be a very doubtful member of the genus, but is unquestionably animal.

1626

2580



Alcyonidium defractum.?

July 1.1806. Publishd by Jas. Sowerby London .

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[Synonyms and names incidentally mentioned are printed in Italics.]

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